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THE BRICKBUILDER

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Feb 27-1912

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ILLUSTRATIONS IN LETTER-PRESS.

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THE BRICKBUILDER

VOLUME XX　　JANUARY 1911　　NUMBER 1

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Advertisements will be printed on cover pages only.

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LETTERPRESS

DOME OF THE CHURCH IN THE COLLEGIATE CONVENT OF SANTA ROSA DE VITERBO, QUERETARO, MEXICO.

This dome is one of the best examples of the famous Mexican Architect, Eduardo Tresguerras. The dome was probably entirely covered with glazed tiles but only the panels of intricate patterns in various colors now remain.

THE PRESENTATION OF PRELIMINARY STUDIES OF ARCHITECTURAL SUBJECTS

BY HUBERT G. RIPLEY.

ARCHITECTURE, of all subjects, affords as fair a target as any for the budding writer. All that is necessary is an imposing array of adjectives joined to a few technical terms with now and then a metaphor or simile that baffles the intelligence; add the proper amount of words and sentences and finish up with a glowing and scintillating peroration, and another "article" lies quivering on the editor's desk.

Now the very title of this series is subject to criticism, in as much as it is liable to the impeachment of redundancy; but as it is only intended as a "filler" to the charming illustrations that accompany it, we will let that pass and proceed at once to the serious consideration of the subject, only digressing occasionally when it is found necessary to fill out the quota of words that are essential to give page *23* a shipshape look.

M. Vitruvius Pollio, one of the earliest writers on architecture, was not wholly happy in his home or office life, and devoted a great deal of time and labor in composing and writing several massy tomes in difficult and abstruse Latin. He pulled the subject apart to see what made the wheels go around, examined it carefully, labeled it, classified it, and finally announced the following discovery:

> "Architecture consists of Ordination, which the Greeks call *taxis;* of Disposition, which the Greeks call *diathesin;* of Eurythmy, Symmetry, Decor, and Distribution, which the Greeks call *oiconomia*."

This definition has never been equaled by any modern writer, even of the Rochester School. It stands to-day like the Parthenon, alone, unrivaled, supreme in its greatness, the despair of the ages. True, Mr. Newton says of it, "Its obscurity may very likely be owing in a great degree to our ignorance of many circumstances of those times, their use of the technical terms; or the different acceptation of words." This admission on the part of so eminent a writer as William Newton (obit circa 1790) substantiates the assertion presented in our first paragraph.

From time to time, when we are "up against it," we shall have occasion to quote liberally from Vitruvius, as we believe in always going to the fount and playing safe. Now then, as regards preliminary sketches.

The Preliminary Sketch is the architect's introduction to the startled public. He bursts from the chrysalis of obscurity and flutters in the sun, clad in many colors, or monotone, or line, or pencil, or any other medium. As Lord Inverclyde, the celebrated architect once said, "Most men buy the *Boston Transcript* to wrap up the *American* in" — meaning that the function of the perspective is to throw a halo around the mistakes and errors of the scale drawings.

Take a typical case; perhaps the young architect's father decides that, after his son has graduated from a four years' course in architecture at the University of Skitomish, followed by six years' training in Paris and two months' experience in the office of W. C. Bowles, he will alter the old barn into attractive eight-room semi-detached suburban houses. Father wants to see right off how the alterations will look. So after the floor plans and an elevation are decided upon, two courses are open. Either the architect may get the Jaques Blanque of his city to show the barn in a fog or early sunrise effect for three or four hundred

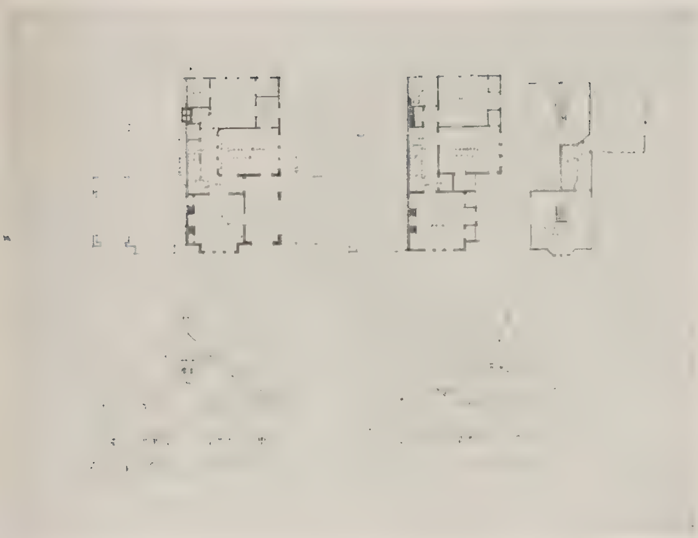


FIG. I.

Showing the young architect's first presentation in pencil on tracing paper quickly made. A positive print is given the client and additional prints struck off for purposes of obtaining estimates, etc.

FIG. II.

Perspective view of the houses shown in Fig. 1, rendered simply in water colors with the pencil lines showing through, accentuating the outlines and shadows. The form and outlines of the old barn have completely disappeared, and the alterations could probably be built for only three or four times as much as a wholly new building would have cost.

dollars; or take the plunge himself, "lay out" the perspective and render it with his own hands.

If Blanque does the drawing, he makes it on the back of some substance that looks like Holland window shade cloth or firecracker paper mounted on trunk board. There is an advantage in making the drawing on window shade cloth because the window shades in the house may be left natural color and texture; also early morning effects are easily suggested by leaving the whole sky window shade color.

The beginner will find a quick, simple and effective presentation by making the floor plans and perspective on thin white tracing paper, using a medium soft pencil, taking care not to smutch the drawing and having one or two Vandyke positive prints struck off by the X-ray Blue Print Company. The change that occurs in the appearance of the sketch is almost always greatly to the advantage of the print. The mere fact of the mechanical process that intervenes seems to lend an adventitious and sometimes a fictitious value to what may be a very ordinary effort.

An attempt will be made to present examples of the various methods employed, as far as the limits of magazine illustration will allow, but the more delicate shades and nuances of pencil and wash are inevitably lost in reproduction. Some architects go in quite extensively for photography in connection with their preliminary sketches, and photographs of a set, each neatly mounted, showing the original drawings reduced to a uniform size, generally produce a good impression on the client. Further on we shall take up the matter more in detail if the public demands it.

In regard to the embellishment of the sketch, care must be taken with the drawing of the cartouch in the upper right hand corner, and it is well to search carefully the volumes of Cæsar Daly, Pfnor, De la Fosse and others for good ones. There's nothing sets off a sketch so well and pleases the client more than a cartouch finely drawn, and many a sketch has "pulled it off," thanks to the allure of the upper right hand corner. It is an evidence of visible skill quite incomprehensible to the lay mind. It reassures the client to find that, while the architect has departed very far from their ideas of arrangement and sizes of rooms, expression of style, cost, etc., here is a spot on the drawing that shows the architect knows his business and is beyond criticism, and no mistake has been made in the "selection" of their architect.

FIG. III.

The first sketch for the seaside bungalow. Note that the gnarled old trees have been carefully preserved and the Pergola Arms shown in the upper right hand corner. The view is taken looking away from the sea, and the trees do not really exist, but they could be planted, and would grow, with careful training, in eighty or ninety years.

A scrapbook of cartouches suitable for owners' names, and titles to drawings, is a handy thing to have, or better still, a card catalogue may be kept for ready reference, so that the "Preliminary Studies for John Smith, Esq. 2d" may be properly adorned.

An advantage in making the sketches so that they may be either blue or brown printed is that slight alterations can be easily made and a new print struck off at trifling expense and labor.

Suppose the next client is a wealthy maiden lady with a mind of her own, who wishes to build a bungalow at the seashore. This time

the architect must take more pains in planning and arrangement, and it might seem advisable to vary the medium and show the building rendered in pen and ink. (The illustrations show several ways of rendering different subjects, from a simple outline sketch to one more in detail. It will depend upon circumstances which to choose.) If the plans have been carefully studied, and the importance of the commission warrant it, a carefully laid out and rendered perspective going into considerable detail may be best to show; or if the sketch is to be a rough, hasty one, many of the undecided details may be barely suggested. The drawings and sketches of Henry P. Kirby show in a masterly manner to what an extent the presentation of preliminary studies may be carried in pen and ink, and should be carefully studied by anyone who wishes to excel in this medium. They are pure architectural drawings of masses and bits of detail, and in their way have never been excelled.

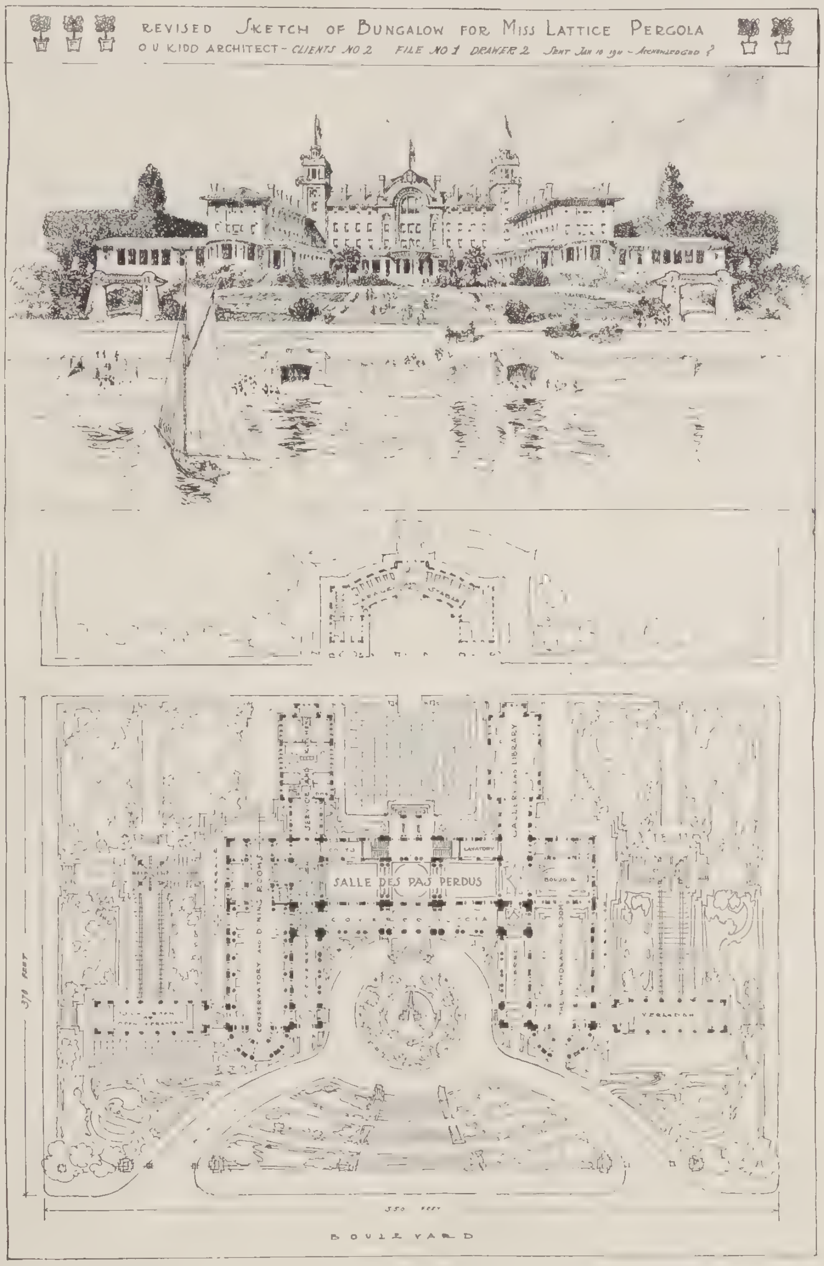


FIG. IV.

See how Miss Pergola's bungalow has grown. The first sketch was duly appreciated, thanks to the cartouch and the trees, but the building did not meet the client's ideas as to style, arrangement, size of rooms, etc. These have now taken a more concrete form, and this sketch shows a well-balanced plan, homelike, cozy, and livable. The estimates, however, may necessitate cutting it down.

Vitruvius says, "Eurythmy consists in the beautiful form and handsome appearance of the members of a composition. This is effective when the heights of the members are adapted to their length, each being correspondent to the symmetry of the whole." To think that Vitruvius said this only two thousand years ago; dear me, how time flies.

Be that as it may — perhaps it would be well to take up for a few moments the consideration of the "little things" that go to make up a sketch, such as windows, roofs, columns, caps, overhangs, doors, chimneys (many a punk façade has been saved by having a fine chimney copied out of Belcher & Macartney) porches, pergolas, pots, box hedges, clipped trees, and shrubs of various kinds, and all the dope that goes to "tickle up" a drawing.

If the exigencies of the drawing demand a row of columns, or a multiplicity of clipped larches, let them be so shown as not to appear monotonous, but each to take its place in a quiet, unobtrusive manner, where possible covering up defects and hiding indefinite or unstudied details with particularly well drawn foliage.

The different mediums of expression in the presentation of preliminary studies are numerous and varied, and it would be impossible to enumerate them all, as every day new ones are being handed out. The range is wide; from thumb-nail sketches with a piece of burnt match, such as Mr. Emerson used to charm us with some years ago, to, in some cases, elaborate and careful oil paintings.

When the Boston Architectural Club was first formed, many happy evenings around the keg were spent, listening to smoke talks by the master of those days. With burnt matches or crayon or pencil-dust some "calé type" (as our Gallic friends would say), would make a thatched roof cottage, or a steamer come sailing up the harbor by moonlight, and the enthusiasm with which these efforts were received by the younger fellows was not surpassed even when the second keg was broached.

Everyone is familiar with the vigorous and convincing perspectives of Wilson Eyre done on brown butcher's paper or gray charcoal paper with pencil, wash, ink and charcoal, all beautifully blended, each sketch admirably suited to the subject. Indeed no catalogue of the T-Square Club was considered fit to be issued without several of these examples, and they stand to-day as models, not only of ideal presentations of preliminary

sketches, but as having assisted in building up and creating an interest in a most charming type of purely American domestic architecture.

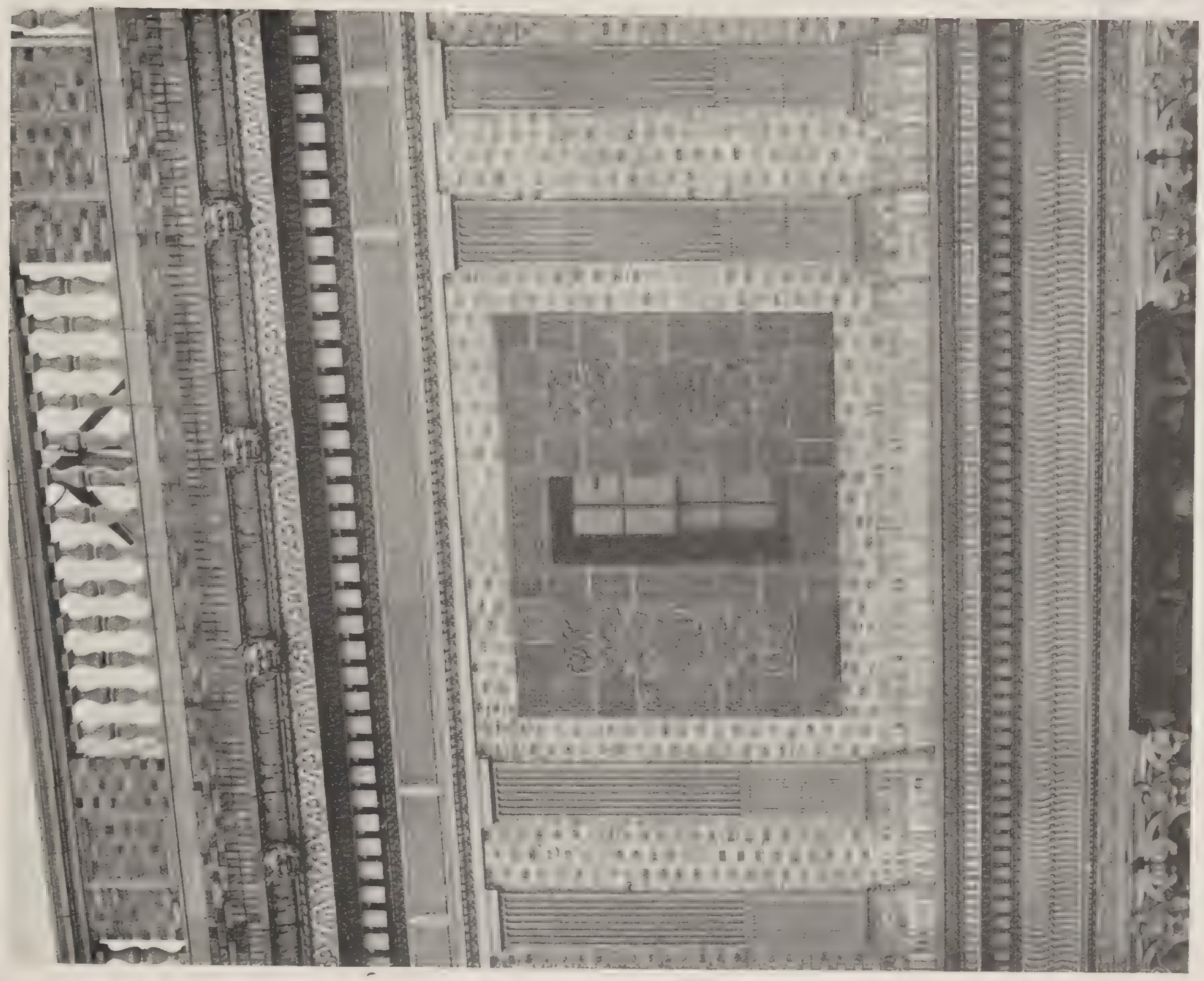
In this connection the work of such men as Harvey Ellis and Oscar Enders deserves the highest praise. There have been many of the school, of which Harvey Ellis was the recognized head, and several architects would have been unknown to fame but for the perspectives which tripped so gaily and lightheartedly from his facile pen. Detail masses, trees, clouds, sky, figures, all seemed to just pour out of the ink bottle and take their proper places on the paper, and yet each sketch showed masterly skill and subtle refinement. The earlier sketches were invariably in pen and ink and on these his fame chiefly rests, though in later days his color drawings were even more highly estimated. "Ah, them wuz the happy days." Sketches such as these were all that made life and the "American Architect" endurable.

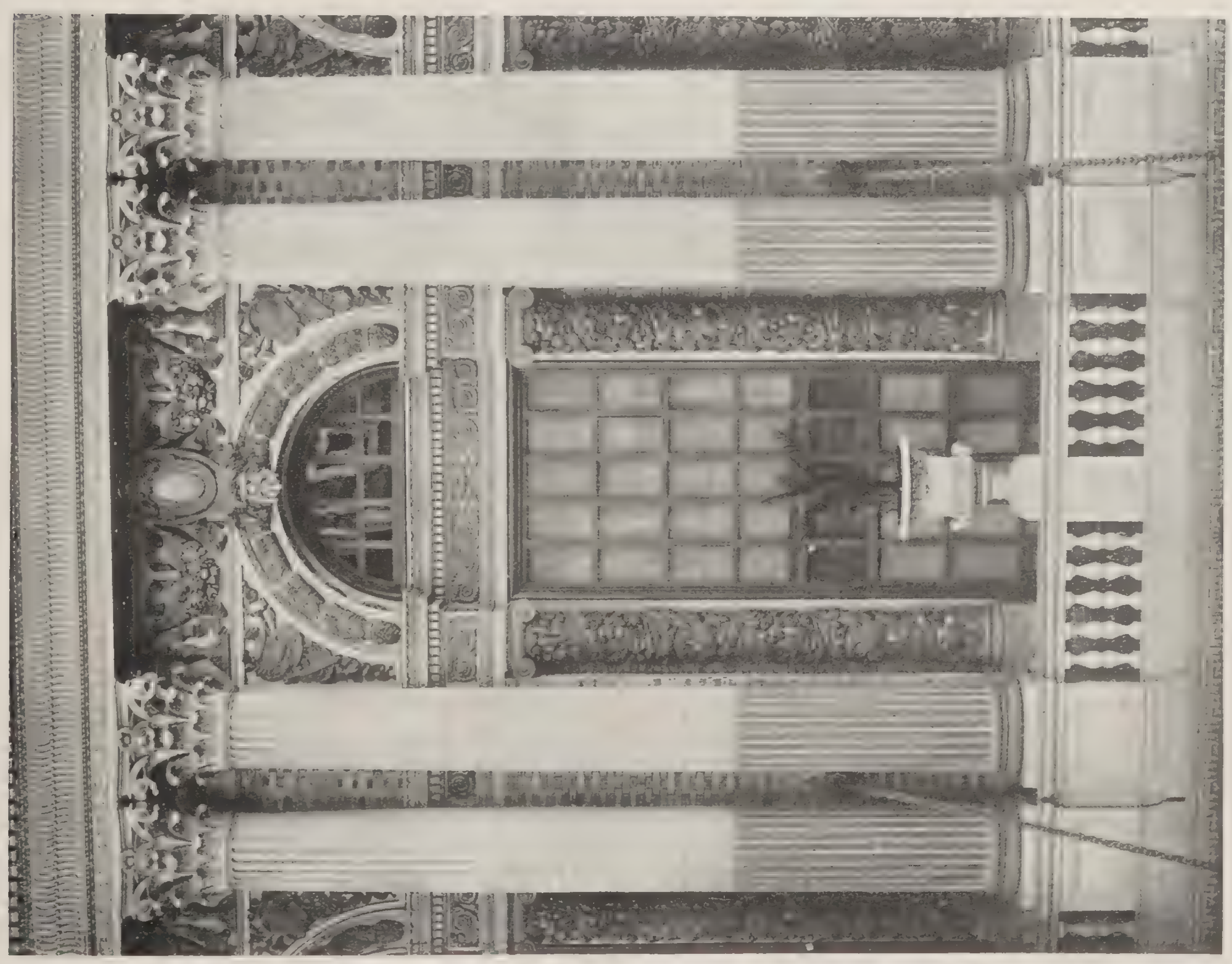
FIG. V.

This sketch of Mr. Le Boutillier's shows how the client's first rough idea may be presented in such a manner as to give all the essentials in a simple, straightforward sketch readily grasped and understood.

FIG. VI.

Shows a house carefully worked out in all its details, restrained, studied and refined, and drawn with accuracy in all its parts. The foliage and window treatment are worthy of close study. This drawing needs no cartouch. (A. B. Le Boutillier, architect.)





EXTERIOR DETAILS, COLUMBIA THEATRE, SAN FRANCISCO, CAL.
Bliss & Faville, Architects.

House at Fitchburg, Mass., William G. Rantoul, Architect.

BY H. A. FROST.

THE house at Fitchburg is situated just out from the center of the town, on the side of a steep hill, where the sharp ascent is broken by a narrow strip of level ground, which affords a pleasant resting place in the climb. The grounds extend approximately 100 yards along the street, and 50 yards back to the house, sloping slightly up from the main thoroughfare. On the opposite side of the house the lawn pitches away rapidly in a series of terraces and then forms a shallow bowl-like depression with a round pool at the far end. Along the rim, opposite the house, is a garden of bright old-fashioned flowers.

Approaching the house from the street one is struck by its simplicity. The walls are of brick, with enough dark headers picked out to give it a texture, without appearing spotted. The roof is double slated, the slates being well selected, and having a wide range of color. A driveway entering one corner of the grounds curves towards the main entrance, broadening into a semicircular carriage turn which is surrounded by a high wrought iron fence, terminating in brick posts. Beyond the main entrance is a more sheltered entrance under a porte-cochère. From here the drive divides, one part turning to the left towards the service portion of the house and entering the stable yard, while the other part turns to the right, and passes out again on to the highway.

On the eastern or street front the manner in which the vestibule breaks out recalls slightly some of the old Hingham houses, though of course the treatment is wholly different. Here the limestone columns carry a simple wooden hood. Overhead, there is a small balcony surrounded by a wrought iron railing, to which access is gained from the second floor by a long window with stone architrave and carved swags, the only bit of such decoration on the house. A living porch with Doric columns and brick piers stretches across the southern end of the house, where it receives the sun the entire day.

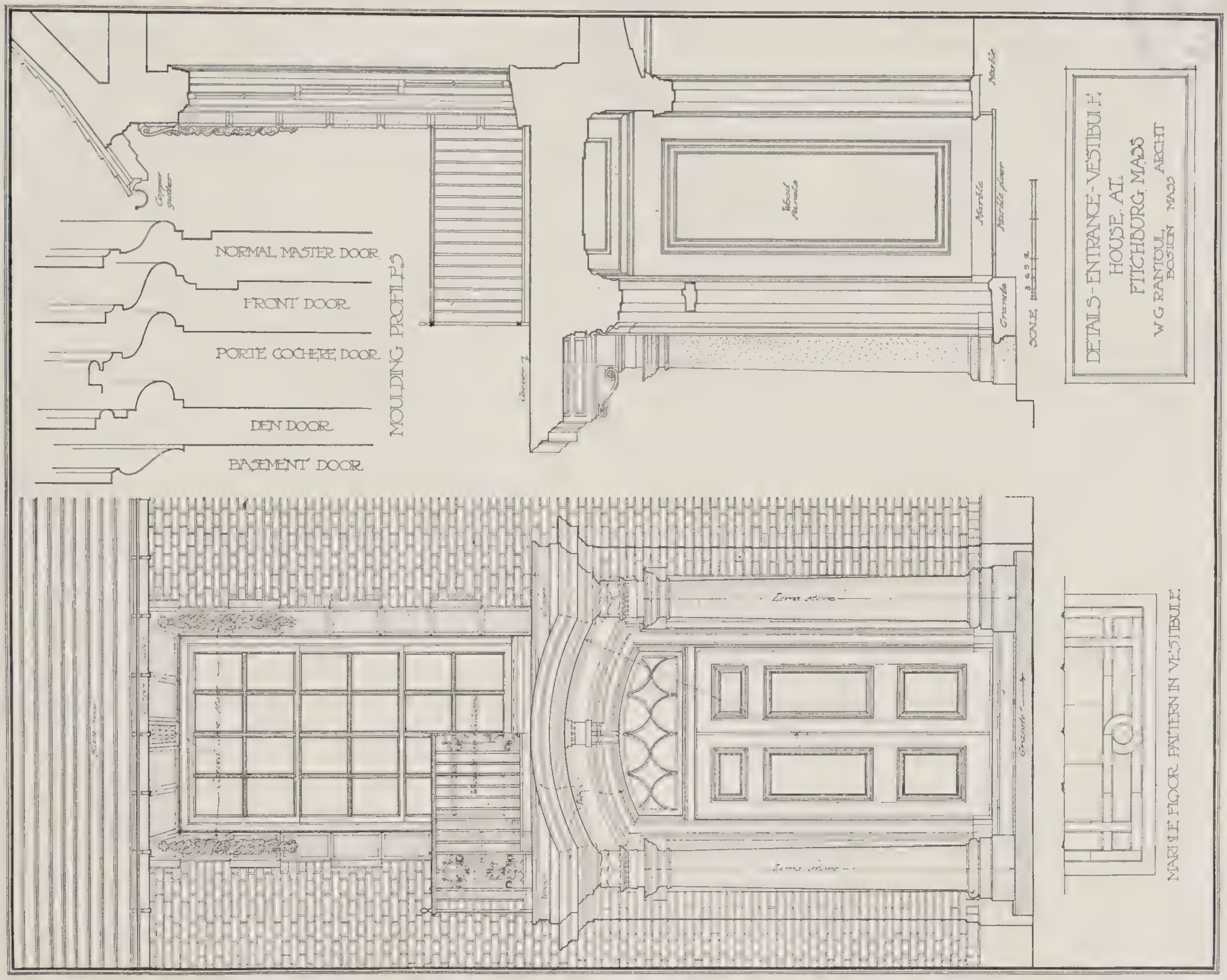

DETAIL OF GARDEN FRONT.

A glance at the plans shows the interior arrangement one would expect; the living room with a southern and western exposure, the library with an exposure to the south, the den with eastern light, and the dining room which has windows facing south of west. The usual tendency, in domestic work, of giving the dining room the morning sun seems hardly feasible here, as to do so would result in an outlook only on the street, and would sacrifice both the privacy and the present view on the rose garden. The hall occupies the center of the house and runs through two stories, having a gallery on three sides, and being lighted from the second floor by the large window over the door. The service wing is properly toward the north, and acts as a screen to the garage and stables.

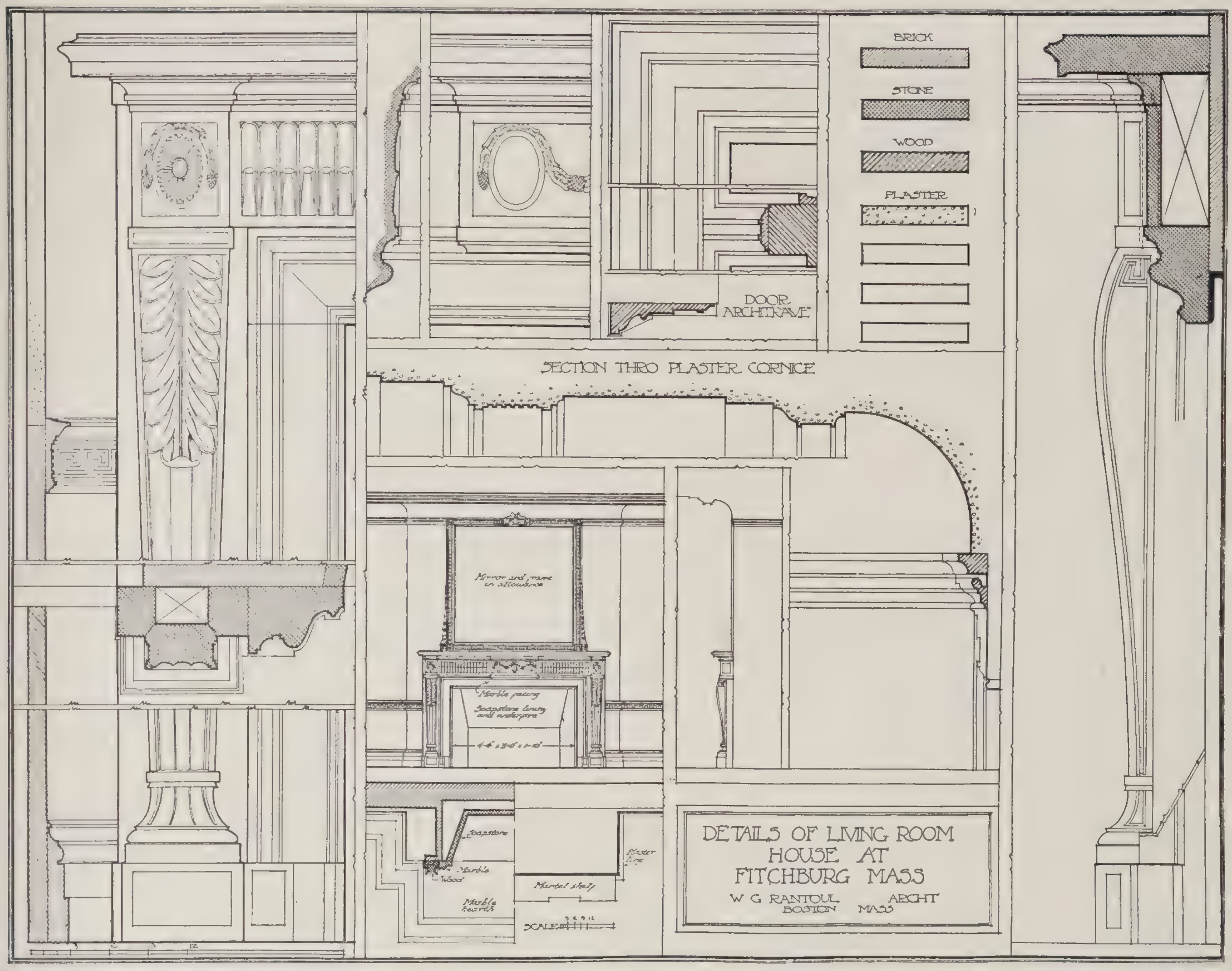
The western elevation commands a view of the grounds, the pool, and the valley beyond with its clustered city roofs, spires, and stacks, while still farther are the distant hills. Although this side of the house is treated with restraint in the use of decoration, as is the front, still the general effect is lighter. The door, wholly glazed, has a wooden enframement projecting just far enough to carry a very shallow iron balcony. It gives access by some half dozen steps to the level of the small formal garden with its flanking pavilions. The dining and living rooms are marked by generous semicircular bays with windows reaching quite to the floor. The central gable instead of carrying a straight pediment line is broken in an interesting manner. Everywhere is a pleasant play of light and shade, the effect obtained always by the simplest methods. A comparison with the street front is instructive. There we find a simplicity amounting almost to severity, while here, where more privacy may be expected, a more informal character is arrived at.

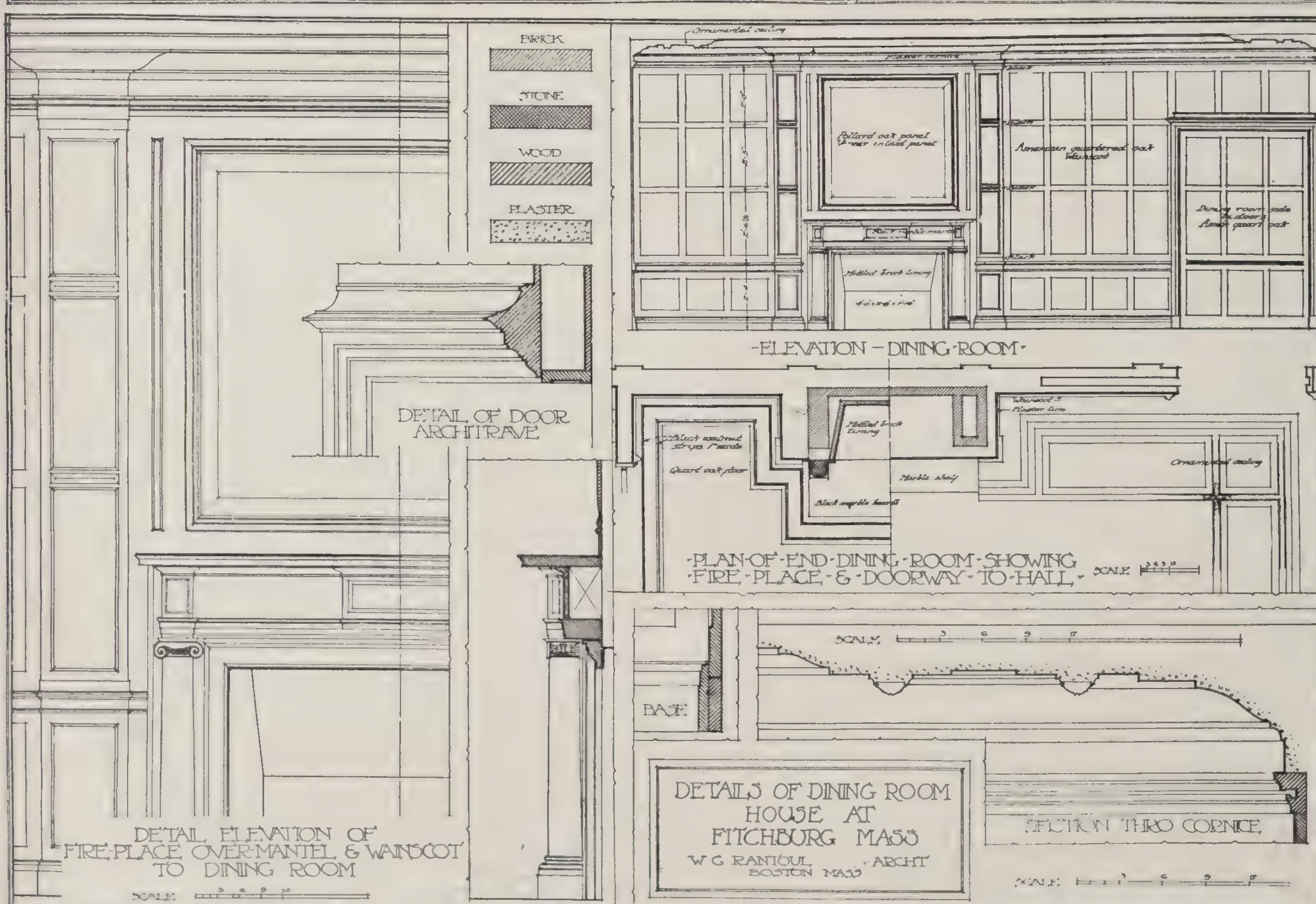
To return to a study of the various rooms of the interior; one enters into the hall proper through a vestibule, the marble floor of which has a pattern marked out by setting some of the joints in brass. Here the floor is of quartered oak. The walls are paneled and painted to the second floor level. The stair treads, rails, balusters, and posts, are mahogany, while the risers are of pine painted. The floor of the broad landing over the front door is of mahogany, while that of the second floor above is of red birch with the finish in pine painted. The walls are plastered and painted, and the ceiling covered with tinted canvas. The treatment of the hall is quite Georgian, and very interesting, with its heavily moulded panels, turned balusters and the limited use of mahogany.

On the first floor the library to the left of the hall, and



ENTRANCE TO HOUSE AT FITCHBURG, MASS.
William G. Rantoul, Architect.


BRICK
STONE
WOOD
PLASTER
DOOR ARCHITRAVE
SECTION THRO PLASTER CORNICE
Mirror and frame in allowance
Marble facing
Soapstone
Marble hearth
Mantel shelf
SCALE
DETAILS OF LIVING ROOM
HOUSE AT
FITCHBURG MASS
W G RANTOUL ARCHT
BOSTON MASS


BRICK
STONE
WOOD
PLASTER
Ornamental ceiling
American quartered oak wainscot
-ELEVATION-DINING-ROOM-
DETAIL OF DOOR ARCHITRAVE
Quartered oak floor
Marble shelf
Black marble hearth
-PLAN-OF-END-DINING-ROOM-SHOWING
-FIRE-PLACE-&-DOORWAY-TO-HALL-
SCALE
BASE
DETAILS OF DINING ROOM
HOUSE AT
FITCHBURG MASS
W G RANTOUL ARCHT
BOSTON MASS
SECTION THRO CORNICE
DETAIL ELEVATION OF
FIRE-PLACE OVER-MANTEL & WAINSCOT
TO DINING ROOM

MANTEL IN DINING ROOM.

MANTEL IN LIVING ROOM.

STAIR HALL.

ENTRANCE.

HOUSE AT FITCHBURG, MASS.
William G. Rantoul, Architect.

the den to the right, have floors of American quartered oak. In the library the finish is of St. Jago mahogany. The paneled dado and bookcases are carried up to the height of 4 feet 8 inches, and above that the walls are covered with a dark paper. The ceiling beams are of mahogany finish, and the plaster of the ceiling is covered with canvas and tinted. The finish in the den on the other hand which is carried to the same height, 4 feet 8 inches, is of quartered oak. The fireplace here has a limestone mantel, while that in the library is of mahogany with a marble fire opening.

The living room opens by wide sliding doors into the dining room, hall and library, and by French windows on to the living porch and to the lower garden level. The bay window, measuring 14 feet across, gives an outlook over the entire grounds. The floor similar to all the first floor rooms is of oak, in this case with a border pattern. The dado is of pine 2 feet 6 inches high with moulded cap and base, treated with applied papier-mâché ornament, and painted. The wall covering is of a warm brown tone, with a cornice of plaster, instead of the wooden cornice, as in the hall. The ceiling is dropped to a lower level in the recesses at each side of the fireplace and in the bay window.

Particular attention may be called to the treatment of the mantels in both dining and living rooms. The two rooms are entirely different in character and the mantels of both are well in keeping with their surroundings. In the living room the mantel and the hearth are of marble with the lining of soapstone. The design recalls the English Georgian and the treatment of mouldings and decoration with the delicate surface cutting is admirably adapted to the nature of the material. The carved and gilded mirror frame above, adds an interesting detail. In the dining room the paneling from floor to cornice, is of dark quartered oak. The mantel is reminiscent of some of the mantels still found in a few of the older Boston houses in the neighborhood of Mount Vernon street. The mantel and fire opening are of black marble. The robust Ionic columns with their well turned capitals carry a simple entablature. Above the mantel is a beautiful oak panel, balanced by two vertical strips of black walnut. Strips of black walnut are introduced at various points throughout the paneling, giving it added interest. The cornice, of plaster, is very rich. The mouldings are less delicate than in the living room but in perfect accord with the character of the room's treatment.

In the service portion of the first floor the floors are of Georgia rift hard pine except in the kitchen where maple is used. The finish throughout this portion of the house is whitewood.

On the second floor the bedrooms and corridors have red birch floors with three course borders. The finish of the base, cornice, and picture moulding is of pine. The ceilings are tinted. The bathrooms throughout have tile floors and 4 foot tile dados. Above that the walls are plastered and painted.

On the third floor are servants' rooms, servants' bath, a trunk room, and a large children's play room where small dances may also be held.

The stable and garage need little comment. The stable has accommodations for three horses, a carriage room, and coachman's quarters on the second floor. The garage is a one story wing with space for four machines. The foundations where they appear above grade are of seam faced granite. The walls above are of brick as in the house.

GARAGE AND STABLE.

The Manual Training High School.—I.

BY WILLIAM B. ITTNER.

HIGH SCHOOLS in which manual training is taught along with the ordinary high school studies are called Manual Training or Mechanic Arts High Schools. Schools of this character are of comparatively recent date, and when designed to meet a general need should not be confounded with special schools such as commercial high schools, technical high schools for boys, technical high schools for girls, english high schools, classical high schools, and high schools of all sorts wherein all the courses are not offered.

The high school course of study, which in the past has had for its chief function the preparation of its students to enter college, is rapidly giving way to a system designed to equip them for their future work. The growing demand of the industrial world for intelligence and skill can best be met by schools designed to train and educate the hand as well as the brain, and the schools best designed and equipped for this purpose will accomplish the greatest good for the people in any community.

The Manual Training School of Washington University in St. Louis was the first institution of high school grade to make instruction in the mechanic arts an essential part of its curriculum. Through the efforts of Prof. Calvin M. Woodward and a number of public-spirited men it opened its doors in 1880 to a system of education which would fit young men for the actual duties of life in a direct and positive manner, while imparting a sound literary and scientific training.

To quote from a recent catalogue of the school: "The conspicuous result of thirty years of manual training is that the young men thus trained have brought to the ordinary duties and responsibilities of life an intellectual and mental grasp of actual conditions which has at once gained for them a clear advantage. They have shown that some mechanical skill and a great deal of mechanical comprehension and power of mechanical analysis have been valuable assets and not unfit accompaniments of refined tastes and good manners. The training has opened new avenues of usefulness to many a lad, and has enabled many others to choose their occupations more wisely, either in the direction of the industrial arts or in other fields. The success of the graduates has been remarkable; and in consequence manual training schools, on public or private foundations, have been established in nearly every large city in the country."

It is only within recent years that buildings wholly designed for instruction in manual training have been erected. This course of study has been introduced in many school systems by altering or enlarging existing buildings to meet the needs of modest or experimental beginnings.

Among the first buildings of the country planned for instruction in manual training in connection with public instruction were the Wm. McKinley and James E. Yateman Manual Training High Schools of St. Louis. These buildings were opened in 1904 and were planned to house all the manual training and domestic science branches in addition to those of the regular high school course of study. They also included instruction in woodworking, wood turning, and pattern making; moulding, forge, and machine work; free-hand and mechanical drawing; bookkeeping and stenography; cooking, sewing, and laundry work.

The success of these pioneer buildings was such as to fix, for a time at least, the type for this class of school buildings. In these earlier buildings, however, the course of study was in its formative period, and it is only at the present time that educators have arrived at anything approximating a general agreement on the course of study.

In most cases the instruction in manual training and domestic science is optional with the students and there is very little definite data upon which to fix the proportion between class room, laboratory, and shop. The necessity therefore of a flexible plan, or one which will permit of easy adjustment to meet the crowding or abnormal growth of any of its departments and their future extension, is of the utmost importance. This, together with the intricate equipment to be provided — proper heating and ventilating, and the introduction of a mechanical plant — combine to make the problem of planning far from the ordinary.

Before considering the plans of individual buildings it will be proper to take up the general plan requirements of a manual training high school.

One of three plans may be adopted. If the school is to have study halls or session rooms three stations must be provided for each pupil, one in the shop or laboratory, one in the study room, and one in the recitation room. It is therefore readily seen that a plan which attempts such accommodation is the most expensive one which can be adopted. Its advantages however lie in the fact that it will provide the most elastic plan, permit of the greatest possible liberty in the organization of the classes and furnish the maximum accommodation.

A second plan and one which is growing in favor abandons the study hall or session rooms and provides class rooms of standard size. These rooms seat from thirty-five to fifty pupils, or two classes, and while one class is at study the other is reciting. A building on this plan therefore is reduced in cubic contents by the space occupied by the large study halls and is consequently less expensive. At the same time its elasticity is retained provided the proportion between class room, shop, and special room has been well considered along with the course of study.

The third and most economical plan is one in which all special rooms are counted as class rooms in the organization of the school. All rooms are used throughout the school day either for the special work for which they are designed or by a class at recitation or study. A building of this character has reached its limit of accommodation when each room has its quota of pupils and will admit of no over-crowding or enlargement of the course of study for which it has been arranged.

Having determined on the general plan of our building, a consideration of its component parts will be in order.

Class Units. Schools are built with or without study halls or session rooms. If planned with study halls the class room is reduced to a recitation room accommodating about thirty pupils. Each room is fitted with recitation or tablet armchairs, and such rooms are best small, 18 to 21 by 24 feet being a good size. They should be unilaterally lighted upon the long axis of the room.

Where class rooms are used both for study and recitations they should be of such area as will accommodate two classes, or from thirty-five to fifty pupils in single desks. An ideal size for such a room is 24 feet by 32 feet 6 inches and it should be lighted on one side only with windows having a glass area from one-fifth to one-fourth of the floor area.

Study rooms are often found seating from two hundred to three hundred or more pupils. A better practice would be to reduce the number of pupils in such rooms to about one hundred and fifty. A room 30 by 62 feet will accommodate this number in single desks, enable proper lighting, give a better distribution of the pupils on the various floors of the building, aid the school management in supervision, and enable students' prompt arrival at recitations. Study rooms should be fitted with single desks, and provided with a platform for the teacher.

Class rooms and study halls should be conveniently located with respect to stairways, laboratory, and shop. Much can be accomplished in their judicious placing to minimize horizontal travel distance and stair climbing.

Laboratories. These may receive their light from two sides if desired as the pupil has opportunity to adjust his position to the light, a condition which is lacking in the class room. Oblong rooms with approximate dimensions of 21 to 30 feet in width and 45 to 60 feet in length are better than rooms of square dimensions. The equipment should be so arranged that the pupil faces the instructor and receives the maximum amount of light from the left.

Laboratories should open en suite with lecture rooms which should be arranged with raised tiers of seats fitted with tablet armchairs brought as close as may be to the instructor's table. In the absence of the lecture rooms sufficient floor space should be allowed at the instructor's table in the laboratory for the massing of the pupils during demonstrations.

Each laboratory should have its instructor's work and storeroom. This should be well lighted, ample in size, and fitted with a workbench, sink and storage cases for the more delicate and valuable apparatus. For chemistry and physics a dark room will be found of value.

The student tables in the chemistry laboratory should be provided with sinks, gas hoods, and reagent racks. A small conservatory for the botany laboratory and an aquarium for both botany and physiology laboratories will be found helpful to house and germinate the water plants and animal life used in the laboratory.

The instructors' tables should be fitted with sinks having a wood cover; there should be a sliding blackboard behind each table. Each laboratory and lecture room should be equipped with lantern for lecture use.

Physics, chemistry, botany and physiology laboratories should be equipped with gas and hot and cold water. Physics and chemistry rooms should also have electric outlets at all tables.

Each laboratory should be provided with a sufficient number of wall cases to house the apparatus. They should be designed for their particular uses and in standard units if possible. Students' individual working tools are best stored in drawers in the workbench or table. A note-book case with writing top will be found a valuable addition to the physics and chemistry laboratories.

Commercial Rooms. In a fully equipped school a business and typewriting room will be found necessary. The equivalent of three class units will be necessary for this purpose. The business room may be fitted with specially designed desks or in a more modest equipment the ordinary single pupil's desk will be found to answer the purpose. Space should be provided for the bank and business houses behind screens with pass windows and standing desk. A storage case should be provided to hold the blanks used by the students.

The typewriting room should be fitted with the necessary number of typewriting desks and the space may be economized by grouping two or more students at a single table.

Drawing. The free-hand drawing and art rooms should occupy the space of two or more class units. They should receive north light preferably through toothed skylight (studio light) with its base about 7 feet from the floor. They should be equipped with storage case for the pupils' drawing boards and materials, adjustable drawing tables, small tables for still-life subjects, a model table for life posing, zinc lined storage case for modeling clay and work, and sinks. A cork panel on the wall opposite the skylight will be of aid to the instructor in arranging and criticizing class work and for exhibitions; the best grades of cork carpet answer the purpose admirably.

Mechanical drawing is required of all the students in manual training and the equivalent of two class units will be required. They should be well lighted and equipped with drawing tables, drawing boards and tools. An economical method of storing the same is effected by a special designed drawing table holding the boards as well as the students' individual tools. There should also be a large table with drawing top and drawers and a blueprinting frame.

Domestic Science. This department will require a room for cooking with storeroom, one or preferably two sewing rooms with fitting rooms and a laundry. These rooms are best if conveniently grouped with sunny exposure and good light.

The cooking room should be of ample proportion (about one and one-half class units will suffice) and should be equipped with a cooking table arranged to hold the individual working kits, and provided with corner sinks. A gas burner and portable oven will be required for each student and a combination gas and coal range will complete the equipment. In the more elaborate rooms an electric oven will be required for demonstrations by the teacher.

A convenient, well lighted storeroom with small refrigerator for perishable supplies is a necessity. A great deal will be added to the effectiveness of the instruction

by providing a small model dining room where the girls may be instructed in table setting and serving. In fact the most complete equipments demand a housekeeping suite consisting of bedroom, dining room, pantry, and kitchen, all fully furnished for instruction in household duties.

The laundry will require the space of a class unit and should be equipped with a nest of laundry tubs, a clothes drier and stationary ironing boards equipped with electric irons.

One or more sewing rooms are necessary. These may be of class unit size and should have a fitting room. Each room should be equipped with sewing tables and machines. The tables should be arranged to hold the students' caps, aprons and work, or storage cases should be provided for the purpose. The fitting room should have storage cases for materials and the hanging of unfinished garments, a fitting platform, skirt and bust forms, and a pier mirror. Both the fitting and sewing room should have a fixed ironing board with electric iron.

Manual Training. The woodworking room should be of ample floor space (not less than 40 square feet per pupil) to accommodate classes of from twenty-four to thirty pupils.

The benches should be substantial and rigidly secured to the floor and should be provided with drawers to hold the individual tools. The tools used in common should be conveniently arranged on the bench back.

If floor space will permit an instructor's bench surrounded with a raised tier of seats will aid the instructor in his work. A grindstone, glue heater, and glue bench will complete the equipment of the shop.

The wood turning room should be somewhat larger than the woodworking room as the benches must be enlarged to receive the lathes. These may be of the belt or individual motor driven type. The equipment will be complete with a tool room where the tools used in common by the students are stored; a storage room arranged with coils for the storage and drying of the lumber; a preparation room containing a cross-cut saw, circular saw, and motor where the lumber is cut to shape for class exercises, and a small room where the articles are varnished and finished. This room should have a fireproof receptacle to hold the paint, oil, and varnish.

A moulding room to accommodate twenty-four pupils should be 24 to 30 feet wide and about 40 feet in length. This will provide the necessary space for the moulding troughs, melting furnaces, and floor space for making up and pouring the flasks. A cupola furnace is not necessary as it is only in the more elaborate schools that iron moulding is attempted. A small furnace for the melting of soft metals is all that is required in a majority of cases.

The forge room should be equipped for from twenty to twenty-four pupils and will require a floor area of 40 square feet per pupil. It should be equipped with down draft forges and underground piping. A room to contain the fan, blower, and motor is a necessity. A drill press, punch and shears, a power hammer, a wet grinder and a filing bench for each two students will complete the equipment for this room.

The machine shop should be about 24 by 60 feet. This will afford the necessary floor space for the machines and filing benches. Machine tools to accommodate sixteen students is all that is required as the number in the fourth year's work will rarely exceed this. The machines should be of standard make and selected for simplicity rather than complication, while one or two of the more elaborate tools may be installed for the use of the more skilled pupils and the instructor.

Gymnasia. If physical training is to be compulsory two gymnasia will be found a necessity. The minimum size of these rooms would be 25 to 30 by 75 feet, and the minimum story height would be 14 feet. The ideal size would be 50 by 80 feet with a story height of 18 feet. Besides the necessary apparatus the rooms should be provided with steel storage cases for dumb-bells, Indian clubs, and wands. Dressing rooms equipped with lockers for sections of fifty pupils each with one or two showers for the girls and showers and plunge for the boys will add much to the completeness of the equipment.

Opinions differ widely on the practicability of a running track as they can only be installed in the larger rooms, are seldom used in class work, and are very expensive. Unless the conditions are most favorable for their installation they had better be omitted.

Library. A manual training school is not complete without its library or reference reading room. This is the room in which the pupil will spend his unoccupied periods and it should be well lighted and equipped with reading tables and metal book stacks.

If the school is of large dimension a separate book or stack room will be found a necessity and the equipment should be such as is found in public libraries.

Rest Rooms. There should be rest rooms for both teachers and pupils. Large rooms are not necessary but they should be well located and equipped for the use of pupils and teachers who are indisposed and who need simple medical attention with an opportunity for rest and relaxation.

Auditorium. The growing demand for the use of high school auditoriums for evening lectures and purposes other than strictly school use demands that they be located on the ground or first floor, and near the main entrance of the building. They should be capable of seating the entire school, should be well lighted with the windows arranged for darkening curtains, and should be provided with sufficient exits to enable their vacation within two minutes. It goes without saying that auditoriums are strictly speaking-halls and should be proportioned to obtain the best acoustic results.

The stage should be of ample proportions with sufficient width to accommodate the stage setting for the class plays, large choruses, and other exercises.

Office. The administrative office of the building should consist of a general and private office, a small reception room, and a storage vault for records. The group should be located near the main entrance and conveniently arranged to facilitate the work of the school.

Lockers. The practice of lining the corridors of a high school with lockers should not be encouraged. Lockers should be placed in large well lighted and ventilated rooms where they can receive proper supervision and care. If for economical reasons they are placed in corridors they should be recessed and ventilated by a system of ducts exhausting the air from the corridors.

Lunch Room. The lunch room forms a very necessary part of a large high school. The short lunch period prevents all except those living in the immediate vicinity of the school from leaving the building at noon. The room should be ample in size and equipped with long serving counters and a kitchen with convenient service entrance.

Storerooms. A modern high school requires two or more storerooms to hold the great quantity of supplies needed by the students. Such rooms should be ample in size, well lighted and arranged with convenient shelving and a work table.

A janitor's room of good dimensions equipped with lockers and a storage room for the cleaning supplies is also a necessity and should be located on the ground floor.

Corridors and Stairways. As all students in a high school are compelled to change from room to room between class periods, it follows that the corridors and stairways should be ample to hold the entire student body at one time in order that the change may be made promptly and without confusion. The corridors should be wide and well lighted having 15 feet as a minimum width for main corridors and 10 feet for secondary corridors. Class room doors opening into corridors of less width will obstruct the corridor and cause congestion and consequent confusion.

The stairways should be well separated with a view of serving groups or tiers of rooms more or less correlated in the courses of instruction. This will minimize the travel distance between rooms and enable prompt response at classes. As the time allowed for change in classes is rarely more than three or four minutes the importance of the judicious planning of the stairways must be apparent. Again stairways are best when arranged in double flights, that is when the same are planned so that the file of pupils ascending is independent of the file descending. Four and one-half and 5 feet will be found the best width for stairways. There should be a continuous hand rail on each side of all runs.

Mechanical Equipment. The heating and ventilating system should be designed to supply 40 cubic feet of air per pupil in class rooms and laboratories, and 70 cubic feet of air per seating in the auditorium. The school should be equipped also with a complete telephone system, program clock, and bell system; vacuum cleaning system; and in most cases a power plant for the generation of the electrical energy to drive its motors and furnish light.

All mechanical equipment should be developed with the plan, and should be both modern and efficient. A successful building demands the careful consideration of its complete equipment and mechanical plant. The drawings and specifications should make ample and complete provision for the same, in order to avoid costly alterations and inadequate equipment provisions, or the inevitable result will be a non-workable school building.

Cost. There are many instances where school committees unhampered by lack of funds have been able to erect fully equipped high schools of monumental character costing one-half million dollars or more. This however is the exception rather than the rule and most school authorities are confronted with the problem of obtaining maximum accommodation with limited funds. The need then of proper planning, the judicious use of materials, and restraint in design are of greatest importance. The completion of the building proper is by no means the end of expenditures for the cost of fixed and working equipment will in most cases amount to from fifteen per cent to twenty-five per cent of the cost of the building when complete and ready to receive it.

Plan and equipment are so varied that no fixed standard of costs can be given but a reference to the cost of the completed buildings which will be described in following articles will serve for illustration.

CHURCHILL'S RESTAURANT, 49TH STREET AND BROADWAY, NEW YORK CITY.
Robert Baer, Architect.

The Principles of Architecture.—I.

BY WILLIAM L. MOWLL.

The Beginning of the Study of Architecture.

BY FAR the greater number of those who have aimed to interpret this art have proceeded by relating its history. Few of the adequate histories make an appeal to the general reader. In the shorter histories it has been necessary, on account of the periods of time to be covered and the space occupied in the mere naming of countries and of architects and buildings with their dates, to exclude the greater part of the discussion of the dependence of architecture upon construction and upon the character and general activities of the nations that produced it, that would naturally have been included except for that pressure. The very bulk of architectural history makes its general familiarity impracticable. Sensibility to fine architecture cannot to advantage be trained exclusively on the admiration of the work of other generations. The success and growth of the art of architecture depend on current appreciation; since there is not time in the individual existence to prepare for this by a long study of history from which shall be deduced principles of correct procedure, it becomes necessary to depend upon the results of the research of others, to base judgment on rules which are the summing up of past experience. Even for the student of architecture, however, there are only meager presentations of those laws of design which have emerged from all the study of the history of this art to which the profession has necessarily given itself.

Architecture may be enjoyed without elaborate historical knowledge if it is studied with the aid of the ideas of abstract design, observing the interrelations between the use, the construction and the arrangement of the parts of each composition. This method of approach has the advantage of proceeding to the study of a building itself rather than its ancestors. It may use as the material of its study contemporary art. It has the further advantage of preparing for some degree of enjoyment in any kind of architecture, whether in the manner of those periods in which the art rose to its highest levels and there was the most intimate relation between the construction and the appearance of the finished building, or in the manner of those other periods commonly asserted to be less fortunate, when the decorative result was more independent of the construction.

Architecture is the art of building in accordance with the laws of fitness, stability and expression; or, "architecture is the art of building in accordance with the laws of expression," for all building necessarily involves fitness and stability. Expression alone is lacking to raise any construction into the realm of architecture.

Besides achieving practical fitness it is the duty of the architect to so design that not only shall the dimensions and arrangement accommodate the physical activities for which the structure is intended, but that it shall also be suitable to the inherent character of its use. As distinguished from practical fitness this may be described as a fitness to ideals or spiritual fitness.

Architecture is replete with illustrations of the truth that any kind of order may be pleasing even when the forms which are arranged are indifferent or ugly. This is certainly not to argue that the parts so disposed need not be cared for as appeared to be the case in Barocque architecture, but only that order is essential and contributes to beauty. Beyond the field of order as an element of satisfaction, the relation of the appearance to the actual constitution of the structure is another analyzable form of beauty, for which laws may be stated and the appreciation of which may be developed by study. Organic beauty is a source of esthetic pleasure, not, it is true, immediate in its appreciation as is intrinsic beauty but depending upon a more or less conscious analysis of the object and upon a perception of the harmony between its parts and their functions, such as occurs, for example, in the relation between the forms and arrangements of walls, piers and arches, their manner of enclosing or supporting, and in their mutual adjustments. So far only do laws of beauty exist that may be stated and their application observed. Intrinsic beauty which lies beyond the kinds already mentioned is unanalyzable and the capacity for its appreciation is only to be cultivated by the development of such faculties as the individual may possess and in a suitable environment. Beauty in architecture is, after all, — and it is to be suspected that this is true of other arts as well — a by-product of expression.

This brief indication of the possibilities of expression applies equally well to stability which with fitness makes up the subject matter of the expression of architecture. The stability of a building depends upon comparatively simple laws. There is, however, no necessity for the layman to study mathematics and construction in order to appreciate architecture. The visible portions of the perfect work of architecture explain the parts of the construction of which they form a part or to which they are applied. This they may do by giving assurances as to the properties of the materials employed. In a rusticated block of stone, the shape is made conspicuous. The harder and tougher the stone the longer it may be in relation to its height. The emphasis upon its shape declares the qualities that directed its choice. This is the beginning of the function of expression in architecture, to make clear at a glance the relative properties of the materials involved, such as their ability to resist crushing or pulling apart, and to set in evidence their texture or color or, further, to bring out their qualities by the character of the carving or modeling. The failure on the part of the factory and the railroad bridge to be more interesting than they already are lies in just this particular. Already, in many cases, having some organic beauty, they fail because of incomplete expression. The enjoyable structure is such because it is intelligible. The base upon the ground, the mounting of the successive stages one upon another and the termination of the work above, with suitable emphases upon the junctions and the ties and thrusts of all the combinations of materials, may each be made to tell its story to the beholder who cares to stop and look. All this variety of detailed emphasis and explanation is not however indispensable to

every work of architecture. Architects have always felt at liberty to pass over facts with regard to materials, to cover up facts with regard to structural systems where the crowding forward of so many different interests would withdraw attention from the central, all important idea. In Byzantine architecture for instance the materials which were available for the actual structural portions were not suited in quality to the sentiment of the builders. They desired a richer and more splendid effect than could be had in the brick of which their piers, walls and vaults are built. Their resources made available beside the brick splendid variegated marbles and glass mosaic, materials not at all adapted to structural purposes as they are too precious to use in masses As a result the construction was completely covered up. Falsehood however has the same practical effect in art as in life; always discovered, it weakens the force of any subsequent statement. Truth in art makes for interest, for credence and for beauty. The force of the appeal which the finished work makes depends on the arrangement of the elements ; and this frequently requires that many facts be passed over lightly in order that a few may make a strong impression.

To establish the idea that an architectural composition may be expressive is to arouse an interest in reading that expression. Yet any composition as a whole is a complex affair, difficult to put together and, to one desiring to understand it, presenting a baffling array of phases. To make the study simpler the forms of which a composition is made up may be separated into groups according to their purposes. To state again classifications already suggested, the elements of an architectural composition are the forms of use, the forms of structure and the forms of expression.

In the first place the whole structure is, so to speak, built around the idea of the edifice and forms a mould of it. The building forms which fit the contained ideas are conveniently called the forms of use for they satisfy either practical or ideal necessities. Of a house the forms of use are the living room, dining room, and so on; and these are in detail such as are dictated by the habits of existence of those who are to live in them. Of a schoolhouse the class rooms, coat rooms, and assembly hall are the forms of use. In a church the auditorium, the Sunday school rooms, the library and so on, together with the dome or the spire constitute the forms of use of its composition, part of them practical, part ideal. Since, in every instance, these forms are first to be considered in any movement to erect a building it might seem that they should be the starting point of the study of composition, but engineers study the arrangement for example, of factories, without trespassing upon the field of the architect, who must proceed beyond mechanical satisfaction and give meaning and life to the forms of use and substance to the ideas that relate to them. His means are first, those common to expression in general as in language, that is, selection and arrangement. He cannot stop at the point where the plan is merely practically efficient but must produce a result which is clear and understandable or even striking. It is impossible however to consider these forms without involving notions of the structural forms in which they are realized. Limitations of greater or less extent are imposed upon the size and shape of rooms or halls by the means of building.

The attention might then be turned first to forms of structure setting aside for the time the study of the forms of use which are produced with their aid. This would place foremost a study of walls and piers, beams and arches, flooring and ceiling systems and so on. The same general possibility of expression by selection and arrangement exists for the construction but with greater limitations. There is less freedom of arrangement because each kind of construction has its peculiar restrictions. The length of a stone lintel for instance fixes the maximum distance between columns and when the arrangement is settled upon, whether from esthetic or constructive reasons, mere revelation or even more or less arbitrary modification in size does not constitute expression or enough differentiate the results from those of engineering.

At this point recourse has been had from the very beginnings of the art to certain added forms which assist in the expression of the forms of structure. The capitals and bases of columns and their flutes, cornices and mouldings have in general no structural function whatever but esthetic or expressive functions only. Not the mouldings or other decoration but the expression added to building makes it architecture, whether this be achieved by selection, or invention, and arrangement, or by the use of those explanatory and emphatic additions usually spoken of as decoration, which it seems suitable to call the "forms of expression."

The detail of architecture which is worthy of examination at all includes the simplest and most indivisible forms of any architectural composition. When each form added to the bare structure or each modification of the forms of the materials and structural systems is regarded as not superficial or purely arbitrary but as significant, then these forms assume a very considerable importance. The study of the decoration is the avenue in the first place to a knowledge of materials. Besides this they furnish emphases and explanations of structure and still further often act as guides to the location, importance and sentiment either of the forms of use themselves or of the whole structure. The forms of expression of all the "styles" are of the same general kinds. Some such as reliefs and statues, mosaics and paintings are symbolic. By means of images of well known forms they arouse associated ideas and thus convey suggestions of the character of the edifice upon which they are placed. They may by their presence at an important part of the composition guide the attention or even the actual bodily movement of the beholder to an intended part. Beside being symbolic they are thus emphatic, calling attention for instance to a principal room or a main entrance. Another class of these forms may be distinguished which is emphatic only and which does not convey or suggest definite ideas. This latter group includes all the isolated, added forms of expression which are not representative. Lowest of all in the class of simply emphatic forms of architecture are the mouldings and just because of the simplicity of the meaning of these forms and the gateway that their study affords to an understanding of materials and structural systems and of the principles of design, with them the most favorable beginning may be made upon the study of architecture.

Editorial Comment and Miscellany.

THE COMPETITION FOR A HOTEL IN AN AMERICAN CITY OF MODERATE SIZE.

AWARD OF PRIZES.

THE Jury for the Hotel Competition, which was the problem for the last annual Terra Cotta Competition conducted by THE BRICKBUILDER, awarded First Prize ($500) to William La Zinsk and Dwight James Baum, associated, New York City; Second Prize ($250) to Henry Ihmsen Hellmuth and Charles H. Conrad, associated, New York City; Third Prize ($150) to C. H. Dittmer and C. D. Loomis, associated, New York City; Fourth Prize ($100) to Frederick J Larson, Boston; First Mention to J. Victor Vanderbilt, Minneapolis, Minn.; Second Mention to Walter Watson Cook, Boston; Third Mention to George F. Blount and John M. Gray, associated, Boston; Fourth Mention to Albert M. Kirschbaum and Joseph J. Gander, associated, New York City; Fifth Mention to William Adams and Charles Cleary, associated, Boston; Sixth Mention to William R. Schmitt, New York City. The competition was judged in New York, January 21st, by Messrs. Donn Barber, Arnold W. Brunner, Henry J. Hardenbergh, Benjamin Wistar Morris, and Philip Sawyer.

EXTERIOR AND INTERIOR OF CAFÉ AND RATHSKELLAR, WASHINGTON, D. C.
The interior is laid in rough cut "Persian" brick of deep brown and purple hues, furnished by O. W. Ketcham.
Vogt & Morrill, Architects.

PLATE ILLUSTRATIONS — DESCRIPTION.

PUBLIC LIBRARY, BROOKLINE, MASS. PLATES 3–6. The exterior treatment of this building is of buff Indiana limestone and dark red common sand struck Dutch brick. The flat roofs are covered and flashed up and under parapets with plastic slate. Upon the interior the floors of the main entrance halls and vestibules are laid in Tennessee marble and black slate, while the service corridors and toilets are in terrazzo. All library floors are laid in cork carpet except in the librarian's room and trustees' room, where wood block is used. The wall surfaces above the wooden bookcases in the general reading rooms are covered with plaster, while those in the rear "Book Room" are of oak paneled to the ceiling. The design of the rear "Book Room" is arranged with alcoves similar to an English College library. The exhibition room on the second floor has "Monk's Cloth" stretched over wood sheathing on terra cotta and brick backing. All partitions are of brick and terra cotta with considerable wire lath. The heating and ventilating systems consist of hot water and direct heat, supplemented by fresh air, exhaust fans and gravity vents. The exhaust fan system is used only for the children's rooms. The cost of building, including grading, walks, drives, etc., was $224,400.00 and the cost per cubic foot, 32 cents. In cubing the dimensions were taken from 1 foot below the basement levels up to mean roof level — not counting parapets.

WINSOR SCHOOL, BROOKLINE, MASS. PLATES 7–10. The exterior of this building is treated with Indiana limestone and sand struck brick with copper roofing. The floors upon the interior are generally of linoleum; those of the swimming pool room are terrazzo, while certain offices, the gymnasium and the play rooms are wood on screeds. Burlap dadoes with tinted plaster above decorate the wall surfaces. The roof frame is exposed in the play rooms on the third floor. All partitions are brick or terra cotta. The heating and ventilating systems consist of direct steam supplemented by plenum fans. The school accommodates two hundred and fifty pupils. The cost per cubic foot was 23½ cents not including furniture and commissions. The cubage was taken from 1 foot below basement floor to halfway up the pitched roof.

CHELSEA CITY HALL, CHELSEA, MASS. PLATES 11-14. This building is an example of the early Colonial style and follows in grouping the plan of the Independence Hall, Philadelphia. The exterior is designed in brick with joints ruled deeply and trimmings of gray terra

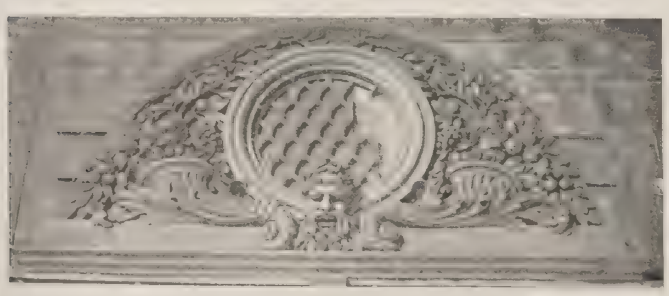
cotta. The roof is of slate with dormers, balustrades, etc., of copper. The main entrances have iron balustrades with balconies of the same material above. The entrance vestibule and corridor are finished in marble and plaster, the corridor having a flat vault in the second story while the vestibule walls above the marble are treated in panels. The stair hall is decorated with plaster-paneled mouldings and vaulted ceiling. The staircase is of marble and iron. The two main rooms at the ends of the second story corridor are designed in wood and plaster with large panels and rich mouldings. The total cost of the building was $211,000.00 exclusive of the furnishings, while the contents approximated 750,000 cubic feet, the cubage being taken from the basement floor to the middle point of the roof.

HAMPSON BUILDING, WATERBURY, CONN.
Trim of polychrome terra cotta made by Atlantic Terra Cotta Company.
Griggs & Hunt, Architects.

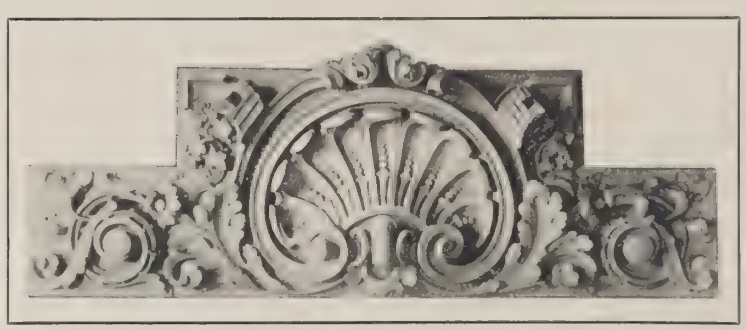
SUCCESSFUL COMPETITORS FOR GOVERNMENT OFFICES.

THE following announcement has been made with respect to the three new department buildings which are to be erected on Pennsylvania avenue facing the White House grounds, Washington. Arnold W. Brunner, a former member of the Art Commission of New York City, won the award for the State Department Building, to cost $2,200,000; Donn Barber was chosen for the Department of Justice Building, costing $1,900,000, and the firm of York & Sawyer secured the Commerce and Labor Building, which is estimated to cost $3,650,000. The successful architects will revise their designs, wherever practical, so that the group of three buildings will form a harmonious whole. The Department of Commerce Building, the largest of the three, will occupy the center, flanked on one side by the State Department and on the other by the Department of Justice Building.

These structures, designed in a simple classic style, will be built of white marble, thus harmonizing with the House and Senate office buildings, the new municipal building and the wings of the Capitol. Of the fifty-nine competing architects, twenty-eight were from New York, the others included the leading architects of Boston, Philadelphia, St. Louis, Chicago, Washington, Cleveland, Detroit and one from San Francisco. Those who received honorable mention were James Gamble Rogers, Warren & Wetmore and



DETAIL.
Executed in faience by the Rookwood Pottery Company for the Palm Room in the Hotel La Salle, Chicago.
Holabird & Roche, Architects.



DETAIL.
Executed by New York Architectural Terra Cotta Company.
Schwartz & Gross, Architects.

Harold Magonigle, all of New York, in the State Building contest; Cass Gilbert and Percy Griffin of New York, and Parker, Thomas & Rice of Boston for the Department of Justice; and for the Department of Commerce Building, Tracy, Swartwout & Litchfield, Max Friedlander and George B. Post & Sons, all of New York. The committees of award for the three Government buildings were: Department of State Building — E. V. Seeler of Philadelphia, John V. Van Pelt, J. R. Pope, and Raymond F. Almirall, New York City, and Herbert Langford Warren of Boston. Department of Justice Building — John M. Carrère of Carrère & Hastings, J. Milton Dyer of Cleveland, Russell Clipston Sturgis of Boston, N. C. Ricker, head of the School of Architecture in the University of Illinois, and Alexander B. Trowbridge, head of the Architectural School in Cornell University. Department of Commerce Building — Pierce Anderson of Chicago, Glenn Brown, Secretary of the American Institute of Architects, Henry Bacon, John B. Pine and D. Everett Waid of New York City. The committee worked in co-operation with the Washington Park Commission, of which Daniel H. Burnham is chairman.

DETAIL.
Executed by New Jersey Terra Cotta Company.
Charles B. Meyers, Architect.

HARVARD CHAIR FOR FRENCH ARCHITECT.

EUGENE JOSEPH ARMAND DUQUESNE, architect of the French government and holder from 1897 to 1901 of the grand prix de Rome, has been appointed professor of architectural design at Harvard. Mr. Duquesne, born in Paris in 1868, began his professional studies in the Ecole Nationale des Arts Decoratifs, where he won the prix du ministre, the grand prix d'architecture and the prix Jay. He entered the Ecole des Beaux Arts and received the grand medaille de construction. He also received first mention in the international competition for a palace at Bukarest, the grand medal of the Societe Centrale des Architects Francais, the prix Lusson, the prix Pigny of the Institut de France, the prix Abel Blouet of the Ecole des Beaux Arts and "first-second place" in the competition for the grand prix de Rome. In 1897 Mr. Duquesne received the diploma of architect from the French government, and won the grand prix de Rome of the Institut de France. For four years he held this prize and traveled throughout Europe. During Mr. Duquesne's professional career

OLD HEIDELBERG APARTMENT, PITTSBURG, PA.
Roofed with combination shingle tile made by the Ludowici-Celadon Company.

he served as auditor to the conseil general des batiments civile; was inspector of works for emergency hospitals; and opened an independent atelier for students of architecture. In July, 1908, he was appointed government architect in charge of the restoration and repairs of the palace and gardens of Versailles and the Trianon. It is understood that when Mr. Duquesne takes up his residence in this country he will continue, in addition to his teaching at Harvard, the practice of his profession.

AUTOMOBILE SUPPLY STATION, CHICAGO.
Enameled terra cotta, in two colors, from grade to sky-line, made by Northwestern Terra Cotta Company.
Jenney, Mundie & Jensen, Architects.

UNIVERSITY COMPETITION.

THE Northwestern University competition, just announced, affords the most recent example of the acceptance by a building committee of the principles set forth in the institute's circular of advice on competitions. The circular of information regarding the competition is as follows:

The trustees of Northwestern University have appointed a committee with power to procure a general plan for its campus at Evanston and to appoint an architect for buildings now projected at a cost of three hundred fifty thousand dollars ($350,000.00). This the committee will do through a competition which has been approved by the American Institute of Architects through its Illinois Chapter, and will be conducted by Prof. Warren P. Laird. It will be restricted to twelve architects, of whom four have been especially invited, while eight will be selected from the open field. To the former, and those three among the latter rated by the jury as best, will be paid each a fee of five hundred dollars ($500.00) and traveling expenses incurred in an inspection of the site; such fee, in the case of the appointed architect, to apply on account of his fee as architect of the work. The jury will consist of the adviser and two other architects chosen by the competitors from among five or more nominees selected by the adviser. The appointed architect will receive one thousand dollars ($1,000.00) for the use of his general plan in addition to the fee of six per cent (6%) on the work. The competition will close April 15, 1911; the official program was issued about Jan. 20, 1911.

DETAIL FOR MUNICIPAL BUILDING, SPRINGFIELD, MASS.
Executed in terra cotta by the Conkling-Armstrong Terra Cotta Company.
Pell & Corbett, Architects.

STATE BOARD OF ARCHITECTURE.

A BILL for an act to provide for the appointment of a State Board of Architecture for the licensing of architects and the regulation of the practice of architecture is being considered by the general assembly of the state of Indiana. Provision is made for a State Board of Architecture to consist of five members. The board shall have full authority in the consideration of applicants for license to practice architecture and shall arrange for at least two examinations each year. Every licensed architect shall possess a seal which will be used on all drawings and specifications. Punishment by fines and imprisonment will be the penalty for any infringement of this law. The bill aims to raise the standard of the practice of architecture to the highest level of

WAITING ROOM, RAILWAY STATION, WATERBURY, CONN.
Showing Guastavino ceiling construction.
McKim, Mead & White, Architects.

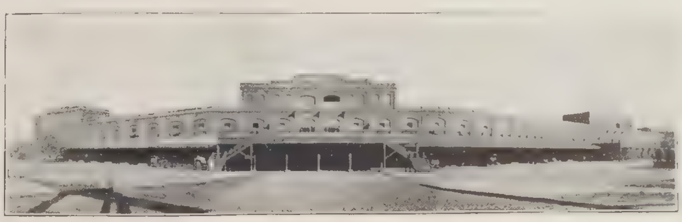
DETAIL OF CORNICE.
Work of the American Terra Cotta Company.
Kees & Colburn, Architects.

excellence, bringing credit to the profession as well as infinitely better service to the general public. A similar law exists already in the states of Illinois, New Jersey, California, Colorado and Louisiana.

ST. GABRIELS SCHOOL, NEW YORK CITY.
Body of the building of "Tapestry" brick. Faience frieze and panels between windows executed in color by The Hartford Faience Company.
John V. Van Pelt, Architect.

INTERIOR OF RAILWAY STATION AT WATERBURY.

AN interesting example of the increasing interest shown by the railway companies in erecting buildings of architectural beauty as well as of utility and permanence, is the waiting room of the new N. Y., N. H. & H. Ry. at Waterbury, Conn., McKim, Mead & White, architects, illustrated in this issue. The walls are laid in ornamental pressed brick, the mouldings and cornices in terra cotta, and the vaulted ceiling in the Guastavino system, in repressed, buff colored tile, laid herringbone pattern, spanning over the entire room. The arch is an elliptical vault intersected by penetrations giving a groin effect to the vaulting.



BUILDINGS OF THE NORTH GERMAN LLOYD STEAMSHIP COMPANY, HOBOKEN, N. J.

THE PRINCIPLES OF ARCHITECTURE.

CONSIDERABLE benefit may be derived, especially by the architectural student and draftsman, from a careful reading of Mr. Mowll's series of short articles on "The Principles of Architecture," the first of which will be found in this issue. In the development of the architect it is at least desirable, if not essential, that some consideration be given the underlying principles of good architecture as deduced from the history of the past as well as a keen appreciation for the best examples of present work. Mr. Mowll's treatise will be found valuable as his ideas are a careful expression of the results obtained from a very thorough study of this subject.

IN GENERAL.

"Building Progress" is the title of a new publication which has just made its appearance. Judging by the character of the contents of the initial number it should prove to be very interesting to those who would keep in touch with modern methods of construction. It is announced as a monthly publication, and the subscription price is $1.00 per year. The work is edited by Sherman Ford and published by the National Fire Proofing Company of Pittsburgh.

In June, 1908, there was applied to a section of the North German Lloyd Piers at Hoboken, N. J., two coats of Cabot's Waterproof Brick Stain and Preservative. Ever since the completion of the piers the walls have been washed down twice a year to remove the salts which disfigured them with the exception of the section treated with the waterproof brick stain in 1908, which has not shown a trace of salts since the preservative was applied. As a result in July, 1910, this material was put on all the walls of the piers, which are illustrated in this issue, and there has been no sign of salts, a conclusive evidence that the bricks are waterproof and permanent.

The "Tapestry" brick furnished for St. Gabriels School, New York City, illustrated in this issue, was furnished by Fiske & Co., Inc.

Wm. Leslie Welton, architect, has moved to his new offices 1209-11 Empire Building, Birmingham, Ala. Manufacturers' samples and catalogues solicited.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., Dec. 22, 1910.

SEALED PROPOSALS will be received at this office until 3 o'clock P.M. on the 23d day of February, 1911, and then opened, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring) of the U. S. Post Office and Court House at ROSWELL, NEW MEXICO, in accordance with drawings and specifications, copies of which may be had from the Custodian of site at Roswell, New Mexico, or at this office, at the discretion of the Supervising Architect.

JAMES KNOX TAYLOR, *Supervising Architect.*

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., Dec. 23, 1910.

SEALED PROPOSALS will be received at this office until 3 o'clock P.M. on the 3d day of February, 1911, and then opened, for the construction, complete (including plumbing, gas piping, heating apparatus, electric conduits and wiring), of the United States Post Office at HILLSDALE, MICH., in accordance with drawings and specifications, copies of which may be obtained from the Custodian of site at Hillsdale, Mich., or at this office, at the discretion of the Supervising Architect.

JAMES KNOX TAYLOR, *Supervising Architect.*

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., Dec. 28, 1910.

SEALED PROPOSALS will be received at this office until 3 o'clock P.M. on the 7th day of February, 1911, and then opened, for the construction, complete (including plumbing, gas piping, heating apparatus, electric conduits and wiring), of the U. S. Post Office at WATERTOWN, WIS., in accordance with drawings and specifications, copies of which may be obtained from the Custodian of the site at Watertown, Wis., or at this office, at the discretion of the Supervising Architect.

JAMES KNOX TAYLOR, *Supervising Architect.*

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., Jan. 3, 1911.

SEALED PROPOSALS will be received at this office until 3 o'clock P.M. on the 14th day of February, 1911, and then opened, for the construction, complete (including plumbing, gas piping, heating apparatus, electric conduits and wiring), of the U. S. Post Office at BARRE, VT., in accordance with the drawings and specifications, copies of which may be obtained from the Custodian of site at Barre, Vt., or at this office, at the discretion of the Supervising Architect.

JAMES KNOX TAYLOR, *Supervising Architect.*

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., Jan. 7, 1911.

SEALED PROPOSALS will be received at this office until 3 o'clock P.M. on the 18th day of February, 1911, and then opened, for the construction (complete) except elevator, but including plumbing, gas piping, heating apparatus, electric conduits and wiring, of the United States Post Office at NORTH-YAKIMA, WASH., in accordance with drawings and specifications, copies of which may be obtained from the Custodian of site at North-Yakima, Wash., or at this office, at the discretion of the Supervising Architect.

JAMES KNOX TAYLOR, *Supervising Architect.*

THE BRICKBUILDER

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ADVERTISING

Advertisers are classified and arranged in the following order:

Advertisements will be printed on cover pages only.

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G. HOWARD CHAMBERLIN; CRAM, GOODHUE & FERGUSON; PARKER MORSE HOOPER; JANSSEN & ABBOTT; LORD & HEWLETT; PARISH & SCHROEDER.

LETTERPRESS

CHURCH OF SAN JOSÉ, PUEBLA, MEXICO.

The polychrome decoration in tile or this church, is applied on the lantern, dome and "*cimborio*" (clere-story); two colors only being used — the dark shade represents yellow and the light tone, light blue.

The Presentation of Preliminary Studies of Architectural Subjects.

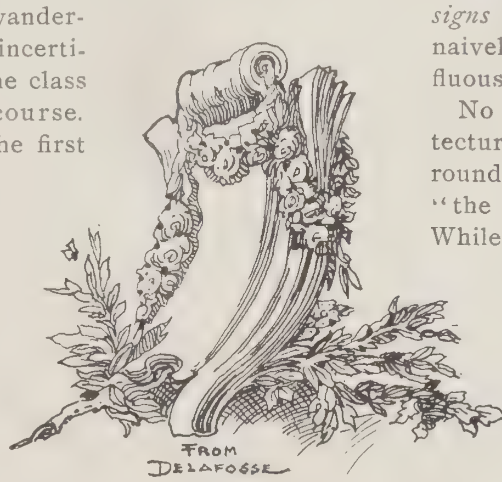
II.

BY HUBERT G. RIPLEY.

"*Freedom for art's sake is simplicity.*"
— *Andronicus Cyrrhestes.*

THE position of a writer on architecture is, in a way, analogous to that of the teacher, although it is far from the intention of this series to assume, like Hermes Trismegistus (one of the earlier architects), the attributes of euphuistic pragmatism.

A rising young teacher in one of the architectural schools, when asked how he conducted his classes, said, "I make the very first lecture as confusing as possible, so that the minds of my pupils are wandering in the crepuscular umbrage of incertitude, and very soon two-thirds of the class stay away or take some other course. Those who remain, and have stood the first lectures, will stand for anything."



It is not supposed that anyone who reads these articles (assuming that anyone does read articles published in an architectural magazine) will find anything new in them. All that is worth saying has already been said, and the whole subject from batter boards to hardware, from reinforced concrete to period furniture, from sill-cocks and tapestries to asbestos shingles and book-plates, has been threshed out, gleaned, garnered, distilled and inflated, and the withered husks left to fester on the compost heap. All that remains is to collect in a few thousand choice words, crisp and sparkling, some of the methods and machinations employed by our well known contemporaries in separating themselves from the creatures of their fancy; in displaying to a cultured and critical audience the congealed music of Parnassus, before it takes its concrete form in sometimes, alas, a too indestructible material.

Lest it may be supposed that we are floundering about in a peripatetic manner without relation, harmony or due sequence being observed, let us turn for a moment to M. V. Pollio, our friend in need. Note the headings of his chapters — how he skips deftly from *music* to *sand* — now considering the construction of *Palestræ*, now the *signs of the Zodiac;* each subject treated naively and exhaustively without one superfluous word.

No article on a subject related to architecture is complete, aldermanic, and well rounded, without some subtle reference to "the twin arts of architecture and music." While this may not be the best place to drag this in, it might be well to get it over with before it is forgotten. Many a drawing has been rendered until it sings, and our Gallic friends frequently allude to harmonies produced by the "chic chic" in some exquisite bit of drafting. Color may be imitated in black and white, and who has not imagined symphonies in the "soft, dull tones" of cramosi, ustium, bistre and dun-amber, as, in the hands of a master like Guerin, they are weaved, blended, fused and mated until our very heartstrings are wrung.

It will not be possible to mention all those whose illustrations have made the coming of the magazines and various club catalogues a pleasure and delight in the past. Nowadays photographs of executed work form a great

FIG. VII.

Study of a country house, J. Lovell Little, Jr., architect. The original perspective was laid out on brown paper and its drawing involved a great deal of labor and study. The final drawing was carefully rendered in pencil on white tracing paper and then mounted on cardboard and slightly tinted. Architects are coming more and more this spring to see the value of having their buildings studied from elevated view-points, particularly when, as in this case, the grounds form an integral part of the whole design.

percentage of the illustrations, but there is in a good drawing or sketch, a charm that even the finest carbon print or photogravure does not possess. It would be invidious, however, not to mention the "doyen" of the guild, to whom, more than anyone else, the budding draftsman turns for sustenance and support. We refer to Mr. D. A. Gregg, who has set the pace for many years, and keeps pushing the mark further and further ahead, with a wide range of drawings and sketches in many mediums. He developed and showed the possibilities of pencil rendering on tracing paper touched up with color, in a manner not before realized or attempted, and these sketches possess a redundant resiliency peculiarly their own.

To come right down to brass tacks, the method is as follows:

Make the drawing, either plan, elevation, section or perspective, on any old piece of paper. Rub it, scratch it, get it all mussed up, do anything you want to with it, even burn it a little with cigarette stubs, only leave enough so that some sort of outline remains that will show through the tracing. If you go too far with the study, it may be necessary to start all over again. Then gum or tack down over this mess, a fresh, smooth piece of thin white tracing paper. After all is said and done, there is no use getting away from the fact that there is one kind of tracing paper better than all the others for this purpose, and were it not that we might be suspected of an alliance with the octopus, we would speak right out and name it.

FIG. VIII.

In this little drawing Mr. Kidd has frankly unfurled his gonfalon in favor of the thatchless thatched roof. Now let the thatchless thatched roof experts look to their laurels, as we predict a brilliant future for this talented young architect.

Use moderate care in making the final drawing, to keep a crisp fresh line, and when all the pencil work is done, blow lightly and evenly with fixatif all over the tracing. Now lay the drawing face down on a fresh piece of paper and soak it thoroughly with clean water. Next, spread a thin coat of paste all over the back, smoothing out the wrinkles and leaving the drawing perfectly flat. Lay a sheet of cardboard over this, reverse the cardboard, and, with another sheet of clean tracing paper and a celluloid triangle or a scale, rub the tracing flat on the cardboard. When a sheet of paper is mounted on one side of a card a similar sheet should be mounted on its back to prevent curling.

After the paste is dry, the sketch may be colored or washed to suit the fancy, mixing a little ox gall with the colors so that they will run well and spread evenly over the fixatif. This does not take a wash quite as smoothly as Whatman's paper, and it will be found that generally the best results are obtained where very little color is used.

Merely to tint, ever so slightly, the various materials in the ghosts of their natural colors will usually be sufficient, as the effect of the pencil lines is lost if a labored or heavy wash covers them. A sure, quick, deft touch is essential, and a feeling for tint. As an architect once told a client when asked what color scheme he would recommend for a certain room, "You can't say what color to employ. Words cannot express the thought. Now I can feel just the color for that room, I should like to see it the color of an Alderney cow, for example."

Many strange and weird receipts for washes have their vogue and from each "hot one" as it is handed over, something may be learned. Here is a jim dandy, warranted not to show shakes, knots or sap, and that will not dry back on preparation of preliminary sketches and has been used many times even by people who know nothing of the French language. The explanation of the process is as follows, and does away with a French dictionary. Work over your tracing or calque until you begin to think you have got something pretty slick, and can almost hear the faint music of the spheres. Now reverse the tracing and make on a fresh sheet of thin paper a final study carefully drawn, and carried as far as you like as to detail and rendering. When this is ready, lay it face down on a smooth cardboard or stretched Whatman's paper (or equal of approved make). Pin or weight this smoothly in place and lay over it a small piece of tracing cloth shiny side up. With

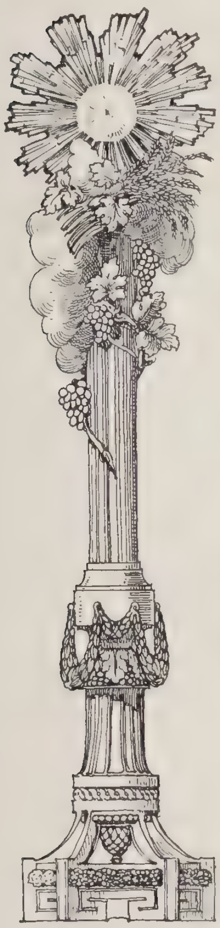


FIG. IX.

A preliminary study for a church, Matthew Sullivan, architect. The original of this drawing was made on a soft warm gray paper with a slightly pebbly surface, which forms the color and texture of the cement walls of the church. There is almost no rendering on the church itself except the pencil outline and the roof, which is a deep rich ustium. The hyetal sky is well contrasted with the lycopodiales and the Pantechnicon on the left. The girandoles on either side (adapted from Delafosse) have nothing to do with the drawing. They are merely placed there not alone for their intrinsic value, but also to fill out the space.

you while you chat with Madeline, the raven-haired sylphide in the office across the corridor. Ivory black, French blue, Indian yellow, burnt Sienna, and lots and lots of Chinese white. Sounds like an international alliance. Mix a tumbler full of this, varying the proportions so as to have most any desired shade, giving the drawing a preliminary wash or staining with an infusion of tobacco or coffee.

Another good preliminary stain for a drawing is equal quantities of green crème de menthe and chartreuse diluted a little with French vichy. This is good both for external and internal use.

So far we have used great restraint as regards words and phrases in a foreign language. They will crop out occasionally, however, and now it becomes absolutely necessary in speaking of "frottying," "calque a pouncé," "lavying," etc.

A "calque a pouncé" plays a very important part in the the left hand hold the tracing cloth firmly over a section of the drawing and "frotté" it. This means rub it swiftly and evenly with some hard, smooth metal or ivory substance. The back of a knife blade is a good thing to use ; likewise a key, or large coin (if you have one), or an ivory paper cutter. If you prefer you can buy especially fashioned "frottiors" in various shapes for this purpose. Be sure to rub only with the grain on the tracing cloth, otherwise wrinkles will appear ; and if too long a stroke or too hard is used, this will also wrinkle it. A little practice and the spoiling of a few choice "calques" will soon show the method. You must rub and rub and then "frotty" for a while, changing the direction, rubbing both ways, and going over the entire drawing with an equal pressure. Do not be afraid of denting or marring the finished drawing as these marks will all come out when the washes are applied or the drawing is cleaned with art gum.

Parenthetically it should be said that it is not necessary to make the "calque a pouncé" complete in all its details if the drawing is to be entirely inked in. One half may be drawn and, if the other side is similar, this half may be rubbed off twice; or, if the building consists of a number of bays each like the other, a drawing of one bay may be rubbed off repeatedly if great care is exercised and fine alignment observed. Likewise parts or portions of the drawing may be made separately and transferred as soon as these sections are determined.

If the drawing is to be a large one it is sometimes well to lay out the general dimensions and axial lines with a fine-pointed pencil over which the different pieces of the "calque" may be laid for rubbing. All these various precautions are taken with the view of preserving the parthenogenesis of the final sheet of white paper, which is handled as tenderly as a mother would her sleeping babe.

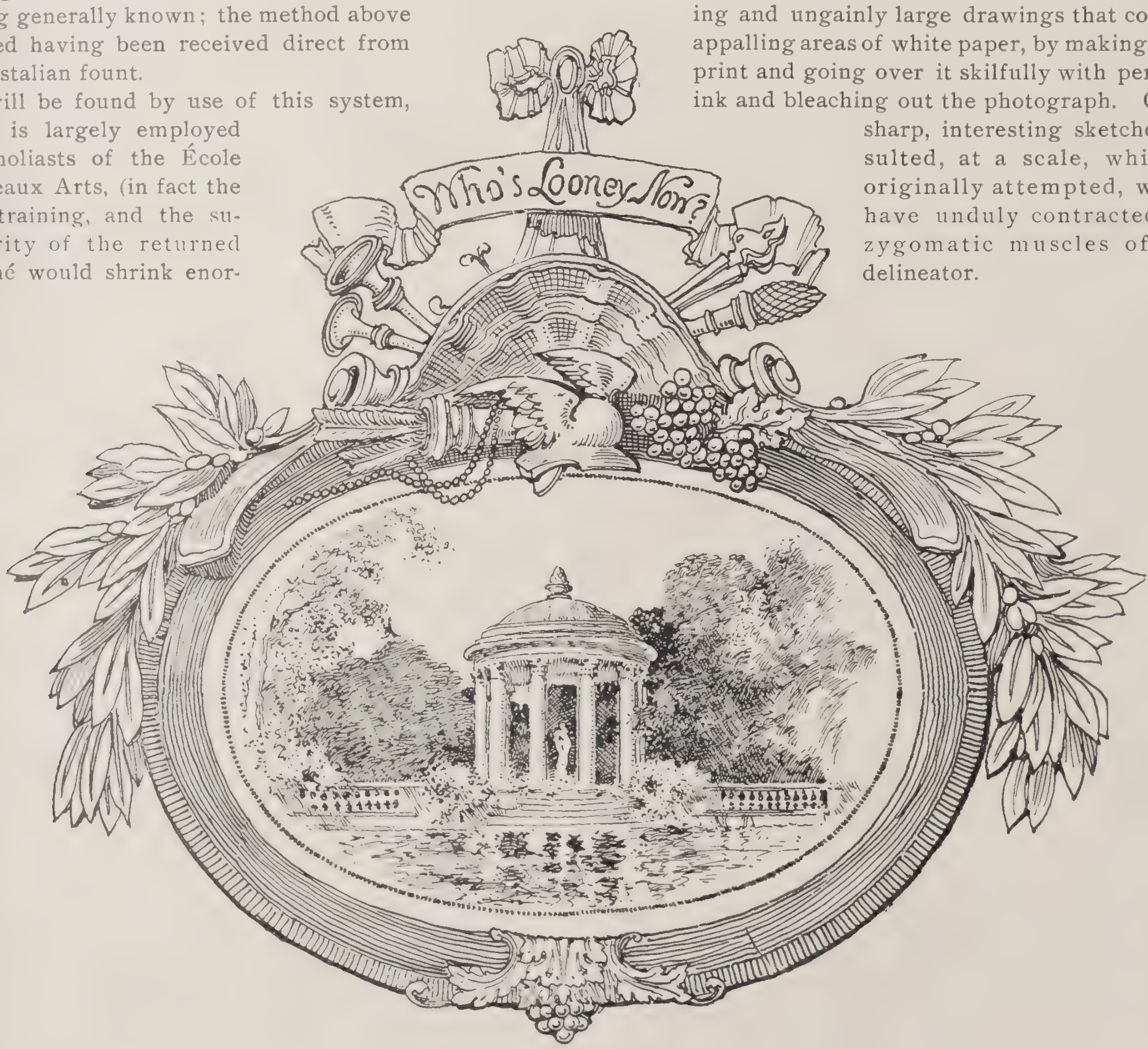
The drawing is now ready to be inked in, or, if skill and care have been used, it may be rendered directly over the transferred pencil outline. Many soft, misty, mysterious effects are obtained by washing directly over the pencil drawing without inking it in, or inking it in only in part, leaving the background or some distant portion of the building in pencil.

This method for the presentation of sketches has many advantages readily perceived, and the secret, jealously guarded for many years, is now becoming generally known; the method above outlined having been received direct from the Castalian fount.

It will be found by use of this system, which is largely employed by scholiasts of the École des Beaux Arts, (in fact the Paris training, and the superiority of the returned diplomé would shrink enormously if this part of the curriculum were omitted) that it is almost impossible sometimes, for one who is not in the secret, to understand or comprehend how in Sam Hill a drawing is rendered; and furthermore the method is just as applicable to perspectives and rough sketches as it is to carefully laid out "concours" or even working drawings. In another chapter we shall have occasion to enlarge on the possibilities of the "calque" as it is the seed from which is engendered the noble forms which are the basis of our Art. Surely here is an example of the Art which conceals Art, by some of our most eminent writers and critics regarded as the ultimate expression of the dual equation, whatever that may mean, and we feel that the value of this series (and incidentally the need to furnish the requisite number of words to fill up this page, because the illustration at the end came out smaller than anticipated) depends on the insistence of the super-subtle and the esoteric, not to put too fine a point on it.

To illustrate how numerous and varied are the methods by which drawings are evolved, we know of a case in which a small sketch hastily done on note paper in pencil was enlarged by sun-printing, touched up with wash and crayon, enlarged again, and again touched up until the final result was a stunning big drawing with all the haze and dreamy mystery of a big city "still in it."

Contrariwise many successful sketches have been produced by photographing down big, uninteresting and ungainly large drawings that covered appalling areas of white paper, by making a salt print and going over it skilfully with pen and ink and bleaching out the photograph. Crisp, sharp, interesting sketches resulted, at a scale, which if originally attempted, would have unduly contracted the zygomatic muscles of the delineator.



The Manual Training High School.—II.

BY WILLIAM B. ITTNER.

THE FRANK LOUIS SOLDAN MANUAL TRAINING HIGH SCHOOL.

THE Frank Louis Soldan Manual Training High School was built to accommodate sixteen hundred pupils in class rooms exclusive of laboratories, demonstrating rooms, shop, etc. It has forty-one class rooms, twenty-three of which are each 24 feet by 30 feet 6 inches, accommodating forty-eight pupils; and eighteen are 21 by 25 feet each accommodating thirty-five pupils. All rooms are unilaterally lighted and fitted with single pressed steel pedestal desks with sliding top.

SCIENCE ROOMS. For the study of botany there are two laboratories one of which is 29 by 40 feet and the other 24 by 44 feet, also two demonstration rooms one 23 by 21 feet and the other 23 by 29 feet. In addition to these there is a conservatory, an instructor's room, and a storeroom, all on the south side of the building.

Physiology. There are two laboratories, one 24 by 44 feet and the other 23 feet by 56 feet 2 inches, two demonstration rooms, an instructor's room, and a storeroom.

Physics. This department has two laboratories one 29 feet by 40 feet 6 inches and the other 24 by 44 feet, two demonstration rooms, and instructor's room, and a dark room.

Chemistry. There are two laboratories, one 24 by 44 feet and the other 24 by 56 feet, two demonstration rooms, an instructor's room, and a storeroom.

Physiography and Commercial Geography have one laboratory which is 30 by 40 feet, one demonstration room, and one apparatus and instructor's room.

MAIN ENTRANCE, SOLDAN HIGH SCHOOL.

The laboratories and demonstration rooms are all arranged to open en suite. Each demonstration room has thirty-two to forty-five seats with arm tablets, while all rooms are arranged for the use of the stereopticon.

SHOPS. There is a woodworking room, 30 by 68 feet, a wood turning room, 30 by 80 feet, an instructor's room, a storage room, a finishing room, a tool room, a preparation and motor room, and a wash and locker room. All of these rooms are in the south half of the one-story wing on the rear of the building.

Grouped together in the corresponding portion of the rear wing to the north are the machine shop 30 by 68 feet, the forge room 30 by 60 feet, the moulding room, 25 by 38 feet, the generating room 33 feet 6 inches by 30 feet 6 inches, the tool room, the instructor's room, and the wash and locker room.

DOMESTIC SCIENCE. Located in the south part of the ground floor of the main building are the cooking room, 25 by 32 feet with storeroom and model dining room, three sewing rooms each 24 by 28 feet with two fitting rooms all opening en suite, and a laundry 21 by 33 feet. These rooms make up the domestic science group.

DRAWING ROOMS. There are four art rooms two of which are 30 by 32 feet and two 22 by 36 feet. Each room is provided with north light through studio sky-lights and is equipped with a storeroom. The rooms open en suite and are on the third floor.

There are three mechanical drawing rooms on the third floor, two 30 by 32 feet and the other 24 by 32 feet, each arranged with top-light and storeroom.

COMMERCIAL ROOMS. There are two commercial rooms on the second floor each 30 by 32 feet, with banking office, instructor's room, and supply room.

OFFICES. On the first floor just south of the main entrance are the principal's office 13 by 21 feet, the reception room 21 by 36 feet, and the business office 21 by 40 feet. A vault for school records opens from the business office.

A retiring room, 21 by 26 feet, with toilet is on the first floor north of the main entrance.

AUDITORIUM. The auditorium is entered from the first floor and the balcony from the second floor corridors. It has a total seating capacity of nineteen hundred and seventy. The stage is 20 by 36 feet, and has convenient dressing rooms. There are six exits on each floor, four at the west and two near the stage. These twelve exits enable the room to be vacated in less than two minutes.

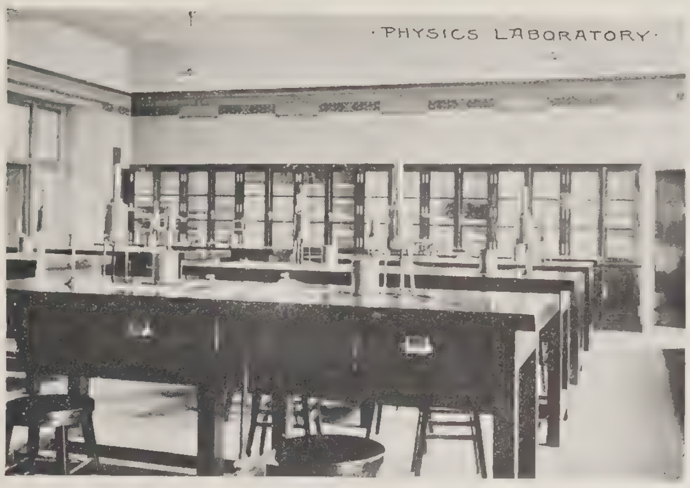
LIBRARY. The library which is located over the main entrance is 36 by 35 feet and has a separate stack room, 21 by 26 feet equipped with metal book stacks.

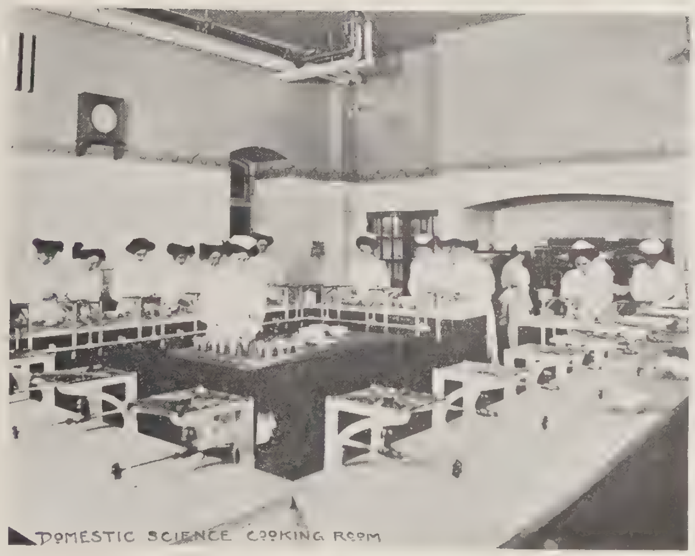
MUSIC AND LECTURE ROOM. The music and lecture room, 36 by 54 feet, is located on the third floor, and seats two hundred and fifty. As its name implies this

Exterior and Four Interior Views.

SOLDAN HIGH SCHOOL, CHICAGO, ILL.

William B. Ittner, Architect.





Six Interior Views.

SOLDAN HIGH SCHOOL, CHICAGO, ILL.

William B. Ittner, Architect.

room is used for lectures, singing, faculty meetings, and is a valuable adjunct to the auditorium.

Gymnasia. The boys' gymnasium, 30 by 76 feet is equipped with lockers, a toilet, four showers, and a plunge bath 14 by 20 feet. The girls' gymnasium 30 by 76 feet has lockers, a toilet, and two shower baths.

Lunch Rooms. There are two lunch rooms, each 40 by 80 feet, located under the central courts with a seating capacity for eight hundred pupils at a single lunch period. Lunches are served from a common serving room and kitchen located between the two lunch rooms.

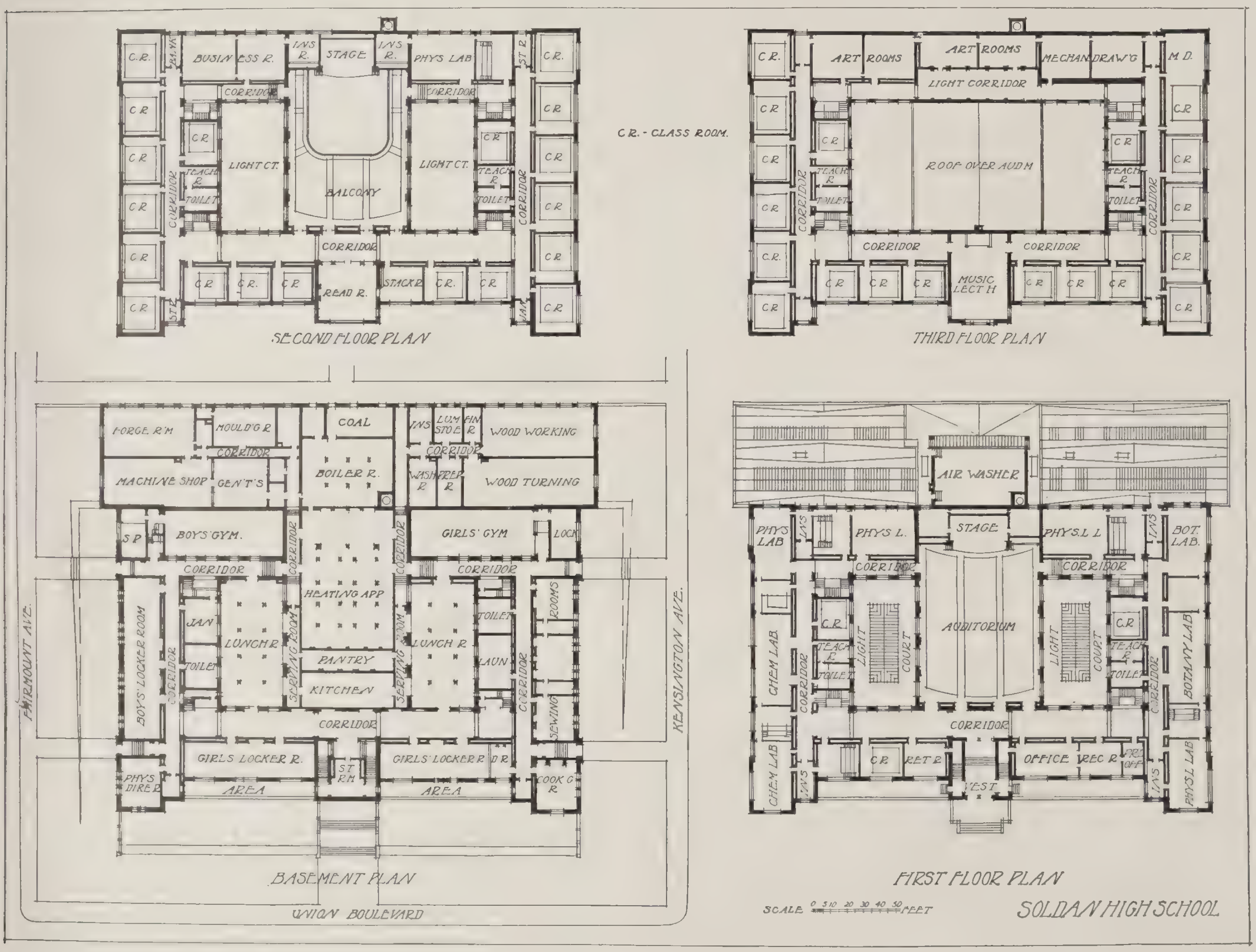
Book Rooms. Storage rooms for books are provided on the second and third floors, each 12 feet 6 inches by 21 feet. A motor driven book lift is arranged in one

Stairways. There are four well lighted stairways arranged at the angles of the building for rapid circulation.

Corridors. The main corridor is 18 feet wide while the north, south, and east corridors are 10 feet wide, all well lighted. On the third floor the art class rooms and east corridor are carried over the auditorium stage where the additional width gives opportunity for a sculpture gallery which is top-lighted.

Lockers. There are two locker rooms for girls, each 21 by 83 feet, and one for boys, 24 by 101 feet.

Heating and Ventilation. There is a mechanical system of heating and ventilation with direct indirect system of heating for the boys' shops. The boiler and coal rooms are to the rear of the auditorium on the alley,



tier of rooms accessible from one of the ground floor entrances.

Janitors' Rooms. There is one on ground floor, 21 by 24 feet, and one on the second and third floors, each 12 feet 6 inches by 21 feet.

Entrances. The main entrance fronts on Union boulevard. There are entrances on the right and left leading to girls' locker room on ground floor. There are four entrances to ground floor, two for boys from Fairmont avenue on the north and two for girls from Kensington avenue on the south. Service entrances for the shops, lunch rooms, etc., are provided in the rear of the building to the public alley.

and the air washer and tempering coils are in a room over the boilers. The fans and engines are located under the auditorium and are isolated in a manner to prevent transmission of noise and vibration. Special ventilation is provided for serving rooms and kitchen.

Cost. The school building which is of fireproof construction throughout, except the roof which is of mill construction, cost complete ready for its equipment $630,000. This gives a cost of 18.6 cents per cubic foot or $395 per pupil, estimating the per capita cost on the basis of the actual number of fixed desks in class rooms only. The equipment cost upon the same basis was $63 per capita.

The Heating and Ventilation of Churches.—I.

BY CHARLES L. HUBBARD.

THE present article, with those which are to follow, relating to the heating and ventilation of different types of buildings, has been prepared with special reference to the needs of the architect rather than of the heating engineer or contractor.

Details relating to furnace and boiler design, piping, etc., have been omitted, and matters which concern more properly the arrangement of the building itself have been considered instead. In some of the larger offices it is becoming common to employ one or more heating engineers to attend to this part of the work, while others call in outside assistance as needed to carry along the heating plans in connection with those of the architect. In the majority of offices, however, the general floor plans are pretty well completed before the heating engineer is called in, and often practically no provision has been made for the space required for different parts of the heating apparatus. Again, if space has been reserved, it is not always located where it can be used to the best advantage. The idea of the present series of articles is to give simple rules and directions, so that the architect may select his heating and ventilating system at the outset, and have in mind a general scheme to be incorporated in his plans as they are carried to completion.

It is not necessary that he be familiar with the details of heating design, but he should have a sufficient knowledge of the different kinds of apparatus used to approximate their size, and to locate them with some degree of exactness.

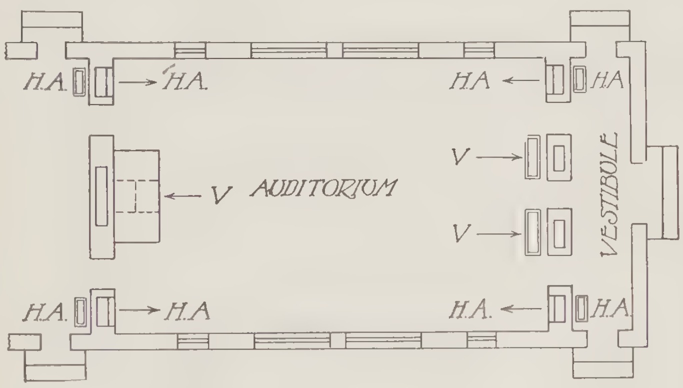


FIG. I.

In treating of church ventilation, the subject will be divided into two parts, the first covering small and medium sized buildings, in which furnaces are commonly used, and the second, treating of auditoriums of larger size, employing steam heat, fans, air purifiers, and other devices not commonly found in the church of average size.

There is no distinctive line in the conditions governing the use of "hot-air" heating, so called.

Furnaces are comparatively inexpensive to install, simple in construction, and easily repaired on account of the accessibility of the different parts. They are especially adapted to churches of smaller size, where the fires are allowed to go out during the week, as there is nothing to freeze, as in the case of steam or hot water.

They are more affected by conditions of wind pressure than a system of steam heating, but are more reliable as applied to church heating than to dwelling houses, because the connections between the furnaces and the registers are shorter and more direct. From a sanitary standpoint they are, as generally installed, not up to a system of steam heating, supplying as a rule, less air at a higher temperature. A standard furnace of large size will supply, under average conditions, heat and ventilation for approximately one hundred people. From this, one can decide in any given case, the number of furnaces they wish to employ, and so be governed in their choice between furnaces and steam heat.

In general, four furnaces is about the greatest number it is convenient to care for, and in modern buildings steam is more commonly employed where more than two or three furnaces are required.

The first step in designing a system of ventilation is to determine the air supply to be provided. This, in auditoriums, which are occupied for only an hour or two at a time, and where the cubic contents is large as compared with the number of occupants, need not be as great as in theaters or even in schools.

With furnace heating very good results will be realized if a continuous air supply of 20 cubic feet per minute per occupant is provided for.

The capacity of a furnace, of standard make and design, is commonly measured by its grate area. With those of the best type there should be about 5 square feet of grate area for each one hundred occupants. If the building is especially exposed, or has an unusually large window surface, increase the grate area from five to ten per cent, depending upon local conditions. This relation between grate area and occupants is based on 15 square feet of floor space per occupant for the entire floor, and a height of 20 feet in the clear.

This is practically the same as allowing 5 square feet of grate surface for each 30,000 cubic feet of space to be warmed and ventilated.

In order to adapt the usual type of house furnace to this class of work it is generally necessary to enlarge the air passages between the furnace and the outer casing in order to provide for the increased air volume. The velocity of flow through these passages should not be over 400 feet per minute, which, with the air supply already assumed, will fix the minimum area as 5 square feet, the same as the grate surface. In practice it is a good idea to increase this about thirty per cent, if the passages are of such form as to break up the currents and bring all parts of the entering air in contact with the heating surfaces of the furnace.

The location of the furnace will depend upon the position of the warm air flues with which it is to connect, and should be so placed as to make the horizontal runs of piping as short as possible. When the furnace supplies a single flue, horizontal piping should be done away with entirely, and the furnace placed directly beneath the uptake.

The chimney is an important detail in connection with any system of heating, for without a good draft it is im-

possible to secure the desired results, regardless of how well the remaining parts of the plant may have been designed. With a chimney from 40 to 50 feet in height, the flue area should be made about 70 square inches for each 5 square feet of grate area, for round flues, and 90 square inches for rectangular flues.

The number of warm-air inlets is limited, in general, to twice the number of furnaces, as it is not advisable to supply more than two registers from a single furnace, for reasons already given.

If furnace heating is limited to churches seating four hundred people, a very good arrangement is to provide four warm-air inlets located as shown in Fig. 1, the same scheme being carried out in smaller buildings down to those of a capacity of two hundred occupants. For churches seating from one hundred to one hundred and fifty people, the arrangement shown in Fig. 2 will give very good results. In Fig. 1, a separate furnace should be placed at the base of each warm-air flue in buildings seating from three to four hundred people, while in smaller buildings, seating two hundred or less, two furnaces may be employed, each supplying two flues. If the rooms are especially long and narrow, in case of the larger buildings, it may be necessary to place an intermediate furnace at the center of the church as in Fig. 3, in which case one furnace may often be made to supply two flues at the south or least exposed end of the room, thus keeping within the limit of four furnaces. There are usually small anterooms and a small entrance at the side or rear of the pulpit which may be connected with the adjacent furnaces, as shown. The main vestibule is heated from the furnaces at the other end of the church, additional grate surface being provided for this purpose in each case. The warm air from a furnace register takes a pretty straight course to the upper part of the room, where it spreads out, and becoming mixed with the cooler air below, by diffusion, gradually settles to the lower part of the room. The occupants are warmed, therefore, by a gradual downward movement of tempered air (about 70 degrees) from above, rather than by direct contact with comparatively hot currents from the inlet registers. This is why as good results may be obtained from two to four inlets, delivering the air through wall registers, as shown in Figs. 1 and 2, as by the use of a greater number of floor registers from which it rises almost directly to the ceiling, and warming but a comparatively small zone in its transit. With the arrangement of inlets and outlets in Fig. 1, the movement of the air is approximately as shown in Fig. 4. This will be affected to some extent by local conditions, such as the opening and closing of doors, exposed glass area and leakage around windows, direction and force of the wind, etc.

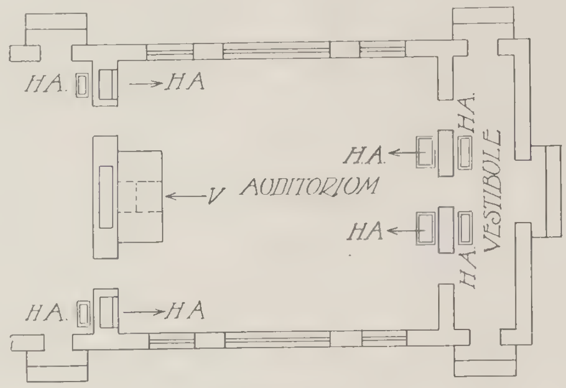


FIG. II.

In general, however, it indicates what takes place to a greater or lesser degree, and shows the reason for adopting this particular arrangement of flues. In Fig. 2, the greater part of the warm-air supply for ventilation is furnished through the wall registers at each side of the pulpit, the vent registers being placed in front of the platform as before. This system is simply one-half that shown in Fig. 1, being made possible by the smaller size of the room. The small furnace, at the entrance end of the building, is for warming the main vestibule, and also for furnishing a certain amount of additional warm air at that end of the room. The general movement of the air currents in this case is shown in Fig. 5. The inlet registers, in the examples given, have been placed in the wall, some 7 or 8 feet above the floor, while the vent registers are in the floor.

Those at the pulpit end of the church may often be worked into the front of the platform, grilles of wood or bronze, or even painted cast-iron, replacing a certain number of panels without producing an unsightly effect.

Another detail, frequently overlooked, is a ceiling vent of generous proportions, to be used in warm weather and at such other times as it may be desirable to change the air of the room quickly or reduce its temperature. This vent should be controlled by means of a damper, operated by a chain from some convenient point outside the auditorium. It should only be used at such times as have been mentioned, on account of the resulting waste of heat. The general ventilation should at all times be through openings at, or near, the floor level. In order to produce sufficient draft in the vent flues in mild or damp weather, and to start a circulation in cold weather, "stack heaters," so called, should be provided. These are simply small cylindrical stoves with an extended mouthpiece, so that coal can be supplied from outside of the flue. The amount of heat required for warming the flues will depend upon various conditions, such as height and size of flue, outside and inside temperatures, etc. For average conditions, satisfactory results are usually obtained by making the total grate area in the flue heaters about one-seventh that of the total grate area of the furnaces. The location of the flue heater, for the best results, is shown later. The size and construction of the flues are matters of especial importance to the architect. The sectional area is based on the velocity of air flow, which, in general, with the arrangements shown, may be taken as about 300 feet per minute in both supply and vent flues. In the former, the temperature will be greater, and the height of the flue less, so that the air velocity, which depends on these two conditions, will be approximately the same in each. If an air supply of 20 cubic feet per minute per occupant

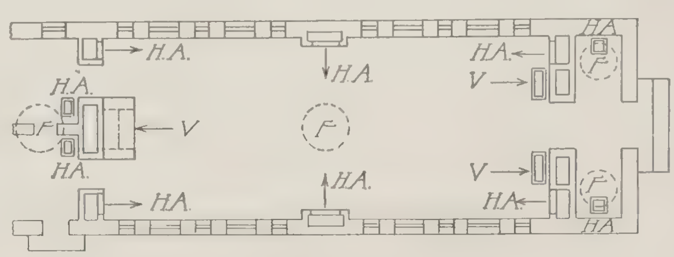


FIG. III.

is assumed, there should be a total flue area of $\frac{20 \times 100}{300} = 6.6$ square feet for each one hundred occupants, which applies to both supply and vent. This, in practice, is commonly taken as 7 or 8 square feet, usually the latter, to allow for the low velocity which it is possible to obtain in mild weather, and the comparatively low temperature of the air passing into the room under these conditions. The flue construction will depend somewhat upon the general character of the building. When of fireproof construction, they are commonly made of tile or brick, or of wire lath and plaster, care being taken in either case to make them tight against air leakage, and of smooth interior finish. With wooden construction, the flues are commonly of galvanized iron, furred in with a lath and plaster finish. The vent flues are sometimes of brick, even in wooden buildings, and it is a good idea to use this material for the lower part of the flue to a point somewhat above the heater, as a protection against fire. Both brick and galvanized iron vent flues should be carried well above the roof and provided with a suitable hood, which must of course harmonize with other architectural features of the building. Sometimes these flues can be made to discharge into an open tower with good results, thus concealing them from view. A suitable arrangement for an adequate cold air supply is an important detail not always given the consideration which it should receive on the part of the architect.

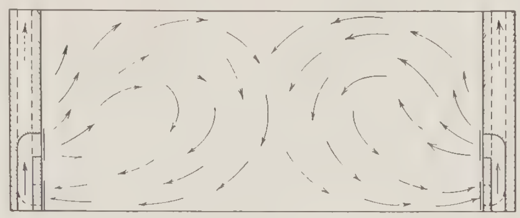


FIG. IV.

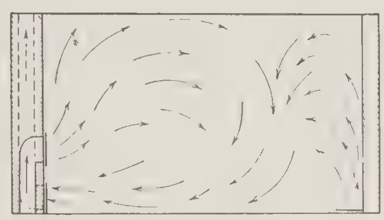


FIG. V.

Each furnace should have a connection with the outside air of at least 6 square feet for each 5 square feet of grate surface, and it is usually best to make it the full size of the warm-air flue (7 or 8 square feet) when conditions will allow. The cold-air duct should, if possible, open toward the north or west, in order to get the benefit of the wind pressure. A better plan is to provide cold-air rooms as shown in Fig. 6, and arrange for inlet windows on three sides. This gives an opportunity to take advantage of the wind from three points of the compass instead of one, and the effectiveness can be still further increased by providing outside shutters which can be used for deflectors, as shown in Fig. 7.

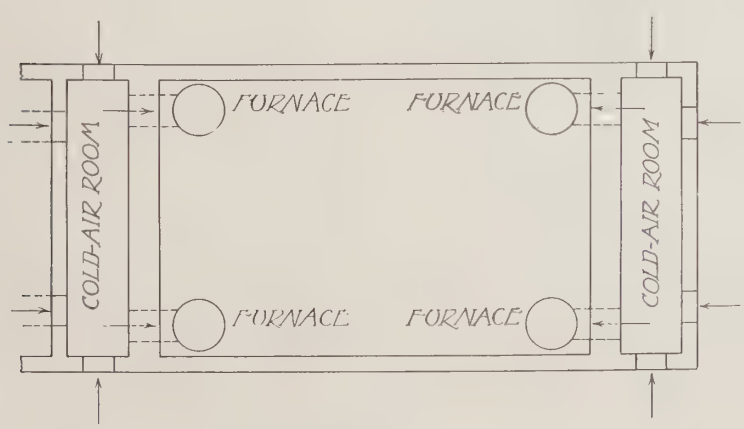


FIG. VI.

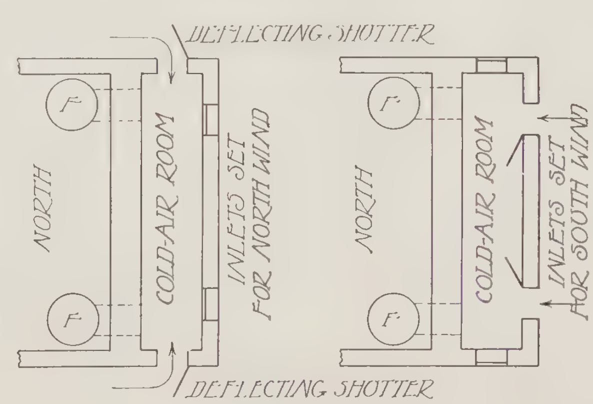


FIG. VII.

The inlet windows should be provided with means for adjusting, to meet the requirements of different conditions of wind pressure and direction.

Temperature regulation, to a certain extent, can be secured by properly controlling the fire, but every furnace layout should also be provided with mixing dampers for close regulation and when it is desired to secure results more quickly than can be done by changes in the fire.

The form and details of construction will depend on local conditions, but the general principle to be followed is shown in diagram in Fig. 8. They should be made to close tightly against angle iron flanges, and be under the control of the janitor from some point outside the auditorium. In designing the mixing dampers, care should be taken to have the cool air pass up the back of the flue and enter the room at the top of the register above the warm-air current, else it will fall after entering the room, and cause uncomfortable drafts upon those sitting below. When introduced at the top of the register, the warm air from below mixes with it and tends to carry it upward as shown in Fig. 9.

It will be noticed that only the auditorium has been provided for in the above. This has been done purposely because the location of chapel, Sunday school rooms, etc., vary so widely in different cases. These may be treated as a separate proposition, bearing in mind that the full ventilating power of the system is not required in the main auditorium during the hour following the service, and at least one-half the capacity of the main furnaces may be diverted to the warming of other parts of the building. When the arrangement allows, it is often possible to do the whole of the heating from the auditorium furnaces by the use of suitable switch dampers.

Another detail to be cared for by the architect is provision for air rotation when warming only is cared for, without ventilation. This applies to the time required for heating up the building on Sunday morning, and at any time during the week when it is desired to warm the church for cleaning, or for other purposes, when only a few people are present.

Rotation consists in taking inside air from the room

and passing it through the heating chambers of the furnace instead of drawing in cold fresh air from out of doors. Under these conditions the air is used over and over again, and is simply a medium for carrying the heat from the furnace to the room, the same as the circulating water in a system of hot-water heating. When the basement is finished, or has a cemented floor and is kept reasonably clean, rotation can usually be secured by opening, or partially opening, the various doors between the auditorium and the cold-air rooms connecting with the furnaces, the cold-air inlet windows of course being closed. Often all that is necessary is to open the doors between the cold-air rooms and the basement, depending on leakage to furnish a sufficient amount of air to carry the heat from the furnace to the room above.

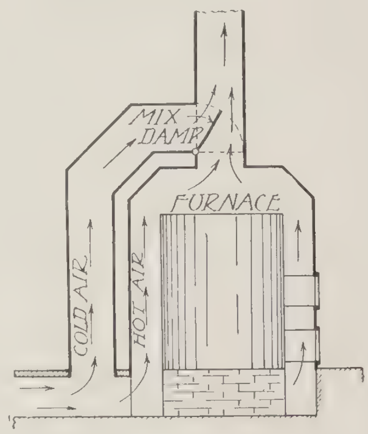


FIG. VIII.

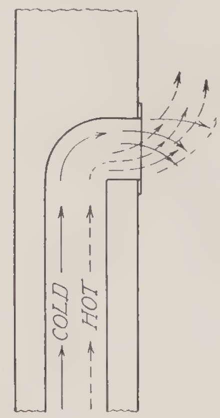


FIG. IX.

When conditions are such that it is necessary to provide special ducts for this purpose it can often be done by placing dampers in the vent flues above the stack heaters and connecting the lower part of the flues with the cold-air chambers, thus making the vent registers serve two purposes. Fig. 10 shows a common arrangement of vent register, stack heater, and outboard flue; while Fig. 11 shows the same provided with a switch damper for sending the air from the vent register either outboard or to the cold-air room.

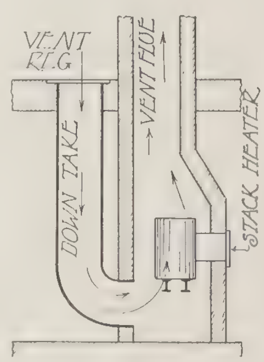


FIG. X.

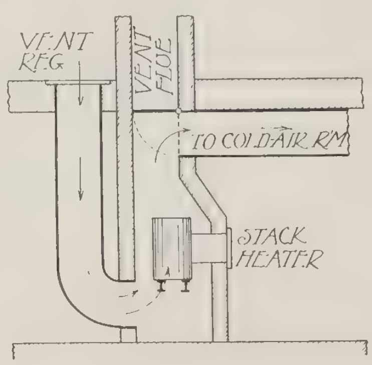


FIG. XI.

In planning for a heating and ventilating system for a church auditorium, a convenient method is to assume one hundred occupants as a basis, or "unit," and proportion the different parts of the apparatus according to the data given in Table I. In this way the size is easily approximated for the conditions in any particular case, and space may be reserved in laying out the plans; while the location of flues and registers may be determined, in a general way, by reference to Figs. 1, 2 and 3.

TABLE I.

Proportions of Furnace Heating Apparatus for One Hundred Occupants, Outside Temperature 0.

Air supply per minute, 2,000 cubic feet.
Grate area of furnace, 5 square feet (30 inches diameter).
Air passages through furnace, 6 to 7 square feet.
Grate area of stack heater, 0.78 square feet (12 inches diameter).
Chimney flue, 40 to 50 feet high, 70 square inches for round flue (10 inches diameter), 90 square inches for rectangular flue (8 inches by 12 inches).
Supply and vent flues, 8 square feet.
Cold air duct, 7 to 8 square feet.

This data is for average conditions; for especially exposed locations, increase furnace grate area from five to ten per cent, or even more, all other dimensions remaining the same as in Table I.

It should be stated that the diagrams accompanying this article are for illustrating principles rather than details of construction, and are for the purpose of suggesting schemes which may be carried out, in part at least, in actual design.

Various modifications will, of course be necessary to adapt them to special cases. For example, a different arrangement of doors from the vestibule into the main auditorium in Fig. 1, or other structural details, may make it impossible to carry up the vent flues where shown, but it may be perfectly feasible to obtain the same result by changing the uptakes to some other point, not too far distant, and connect them with the vent registers by means of horizontal ducts in the basement. In cases of this kind the added resistance should be provided for by making the horizontal portion from twenty-five to thirty per cent larger than the vertical, as computed by the methods already given. It may also be well in cases of this kind to increase the size of stack heater slightly.

Again, conditions may be such that the warm-air flues cannot be brought up at the sides of the platform as shown, and it may be necessary to approximate this arrangement by locating them somewhat further back, and connect with the registers by horizontal ducts at the ceilings of the small rooms in the rear. When this is done, the horizontal portions should be enlarged, as already described, and the change in direction from vertical to horizontal should be well rounded to minimize the resistance.

When it is not possible to utilize the full width of the basement for a cold-air room, as shown in Fig. 7, practically the same results may be obtained by using a small room in each corner and connecting them by an overhead duct of galvanized iron.

In some cases it will be found impossible to provide more than a single inlet for certain stacks, that is, the air must always be taken from the same point of compass. When this is necessary the opening should be made about 50 per cent larger than called for by the methods previously given. If inlets of this kind occur upon the south side of the building it will improve matters somewhat if a swinging deflector is provided, which may be set to catch winds coming either from the east or west.

These illustrations are cited to show how the suggestions given may be altered to adapt them to the special conditions of actual practice.

The Principles of Architecture.—II.

BY WILLIAM L. MOWLL.

The Beginnings of Life.

THE simplest of the minor forms of architecture are the mouldings. A good common example of the use of these forms is the cornice, usually made up of a group of mouldings. Even a slight examination of the tops of the walls of the buildings in any city will include a great variety of cornices above walls of all sorts of materials. Because of a desire to state freshly the motives which prompt designers to produce so many different answers to what appears to be always pretty much the same problem, it is proposed to look back at the beginnings of architecture to see how this art became distinguishable from building and what part cornices and mouldings in general had in that genesis. Inspired from Egypt, the Greeks created architecture of a nobility and power to equal which their successors have expended their best efforts in vain. The union of structural design with that branch of design which deals with the pleasant relations of spots, lines, areas and colors, without taking into account any more difficult questions, marked its origin as it has each of its revivals. It seems possible with the aid of this pure or inorganic design to find out why the great variety of forms used in past architectures were used and to get the answer to this question in such form as to be a constant guide to the designer.

FIG. I.

By common agreement the older and simpler of Egyptian structures are not architecture but building, merely. An example of this sort is the temple at Amada (Fig. I). It has walls and piers of regular rectangular blocks supporting the flat rectangular slabs which form the roof. The actual necessities of putting the building together have apparently, with but slight exceptions, caused every form to take its shape and position. The reasons for the features not strictly structural are not apparent. The builders were evidently so fully taken up with the construction itself as to prevent their adding details that were not absolutely necessary. Design was not yet clearly apparent.

FIG. II.

Examples of this degree of simplicity are rare. Nearly every ancient building in Egypt has that something which makes it architecture. For instance, in the temple at Deir-el-Bahari (Fig. II), a change from the earlier type has taken place without any modification in the manner of building. The plain rectangular piers have given way to columns with numerous flat sides. Instead of being of the same shape from the bottom to the underside of the cross beam, these have square blocks placed at their upper ends just below the architrave.

What was the object of making these piers with a larger number of flat sides than four and of placing the square block at the top? The pier at Amada was quite as effective as a practical means of support. The answer begins to be evident if a number of columns are arranged as in the diagram (Fig. III). The eye naturally follows this succession of forms in one direction rather than the other. This happens on account of the greater degree of contrast, caused by the block at one end of each unit, unbalanced by any attraction at the other end. The vision is directed incessantly about, up and down, right and left. The attention is held by symmetry. The eye moves freely where not so held. In this unbalanced arrangement it moves more readily in the direction of the superior interest, assisted by the parallel lines of the shaft. In the building, the arrangement has the effect of producing a suggestion of impulse upward.

The mouldings upon the portion above the vertical supports, here, as at Amada, where a beam spans from post to post, help this suggested movement. There is more going on at the top edge of the architrave and along the upper part of the cornice, producing together more interest in the upper part of the whole entablature, than at the bottom. The result is an unbalance. Its effect on the eye may be shown in a diagram as in the case of the column (Fig. IV). The eye is impelled through the arrangement to the left. This demonstrates that inequality of contrasts is productive of a feeling of unbalance, unrest or movement, in whatever direction it occurs. This movement may be along lines or across them as the designer pleases.

If the Parthenon, (Fig. V), is compared with the Egyptian temples, the system of construction is seen to be the same, the forms of the details very different. The columns are less ponderous and more graceful. The contrasts of form of the capitals are so arranged as to be more striking than the simple ones already

shown. The movement toward them is helped by two means used in Egypt, that is, parallel lines and a diminution in size from bottom to top. Beside this, the upper portion of the whole arrangement contains a larger number and variety of contrasts of forms than in the Egyptian temple. The entablature is increased in relative height by the addition between the architrave and the cornice of the frieze, the surface of which is subdivided and variously carved and decorated. The top level line of the cornice is unbroken as in the previous example. There is less abruptness and severity in the Parthenon and more or better, style. The motive remains the same, a liveliness given by the use of unbalanced parts but it has received expression with greater clearness, ease and force. The difference is one of manner of expression only. The reasons for the increase in interest are to be found in the form and arrangement of the detail from a general examination of which the underlying principle again appears.

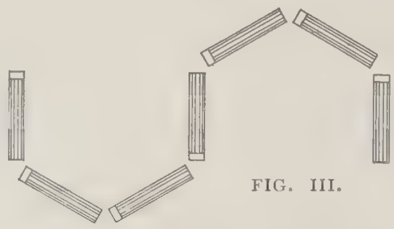


FIG. III.

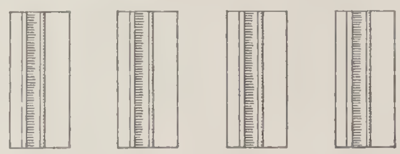


FIG. IV.

At the level of the colonnade the eye moves with difficulty across the vertical lines of the columns but moves freely upward. The shapes of the columns and of the spaces between them, balanced about vertical axes, interfere with a horizontal movement of the eye by presenting symmetrical, upright shapes. The eye falls naturally on the middle of the row of symmetrical objects which are presented at this level. Then, as the columns are more interesting at the top, the eye moves up along the columns into the region of the entablature.

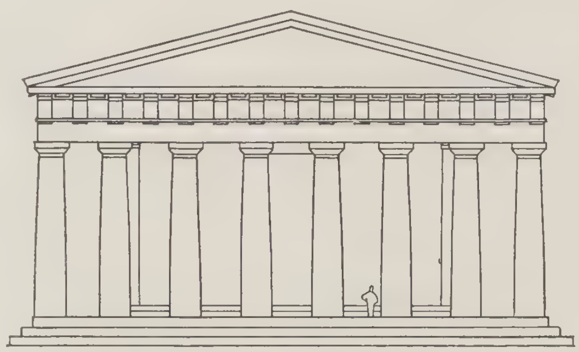


FIG. V.

Impelled by the columns and attracted by the frieze, the eye moves, without anything to arrest it, across the plain band of the architrave into the region of the frieze. Taken together with the triglyphs the metopes form a band along which the eye finds it possible to move horizontally with much less balance to hold it than below. A horizontal movement is more or less arrested by the vertical lines of the triglyphs which give an upward impulse. This is not powerful however, because their vertical extent is slight. The effect of symmetry, holding the eye at the center of the whole and retarding its freedom of movement is no longer felt because the number of parts in the arrangement has been increased beyond seven, which is the greatest number that is recognized as a symmetry.

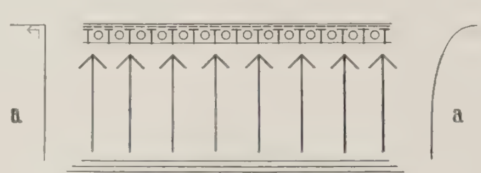


FIG. VI.

Above this band, the upward movement is terminated. There is a further transition however, from the frieze to the cornice line, a set of flat brackets placed upon the under side of the cornice. The balance or unbalance of the lines and parts of the whole is shown by the balanced and unbalanced lines in the diagram (Fig. VI), which reveals the inorganic design which has been added to the bare construction.

In the temple at Deir-el-Bahari movement is present clearly, in the Parthenon it is not only present but is guided and governed. The coincidence between the movement and the actual structural conditions is complete. The vertical continuity of the columns and the unbroken horizontal continuity of the architrave are not only suited to the post and beam but are so arranged as to show what they are doing. The upper edge of the architrave is marked as in Egypt by a horizontal line. Its extent from one post to the next, and its rigidity for carrying the load which it supports are thus emphasized as much as they could be without suddenly interrupting the vertical movement suggested by the column. The two variations of this scheme of upward unbalance or movement may be represented by the lines at (a) in the figures. The Egyptian was abrupt in "stopping" the unbalance, the Greek gradual. The frieze was introduced for no structural reason but to form a step between the vertical unbalance of the column and the complete horizontal of the cornice.

This scheme of movement which has been shown in its origin and its later use in Greece is only one out of the past. The common elements are the life and the pure design idea. The former resides in the construction itself. The old adage "The arch never sleeps" is no less true of the lintel. The law of gravitation keeps all the forces of any building in constant operation. Their action and the resistance to them was felt by the ancien builders to make a theme for their frozen music. The expression of the action of the parts by means of parts added to bring out continuity, balance and unbalance, gives the appearance of movement and life to that which before acted but without witness. In testifying to the forces and reactions of their structures and of the purposes which caused their erection, arose opportunities for the unconscious record of the temper of the builders, through whom flowed into the stones their strength and weakness, aspirations and successes. This is the life of building; it thus becomes architecture.

The life of modern architecture depends similarly on the structure and its expression. Success in expression depends on an orderly use of balance and unbalance; never forgetting that another of the differences between Egypt and Greece was that the Greeks were possessed of a superior sense of beauty.

FORTY-FOURTH ANNUAL CONVENTION OF THE AMERICAN INSTITUTE OF ARCHITECTS.

SAN FRANCISCO, the "Paris of America," extended a most cordial welcome to the A. I. A. Convention held in that city January 17, 18 and 19. This was the first meeting of the Institute to be held on the Pacific Coast and will ever be a memorable one because of the hospitable treatment its members received from their Western confrères, the citizens at large and the public press. The breadth and scope of work undertaken by the Institute was never more fully realized. A vital grasp of our present needs together with the furtherance of such acts as will bring the profession added respect and dignity seemed to permeate each address, each report and each discussion. The large attendance suggests a growing interest that speaks well for future achievements.

The first session of the convention was auspiciously opened at the Fairmont Hotel on the morning of January 17th with addresses of welcome by acting Mayor John A. Kelly and M. H. Robbins, Jr., president of Merchants' Association. Irving K. Pond, president of the A. I. A., in responding, touched on certain of the Institute's relations to the building public as represented by the client; the Institute's attitude as affecting the profession; and the family relations within the Institute. After speaking of the ever-widening circle of influence exerted by the Institute Mr. Pond said: "I touch firstly upon that phase which embraces the Institute's relation to the client. It is the province of the Institute to deal broadly and in detail with the principles underlying the science of building and the ideals underlying the art of design.

"The first great principle upon which the Institute stands is that of justness and fairness in so far as it is given to man to realize these seeming abstractions. In the Code of Ethics, in the Competition Code, in the cognizance it takes of all professional activities, the Institute stands for fair play as between man and man, absolute frankness and fairness of dealing between architects in their professional relations, absolute integrity and fairness in the dealings between architect and client and between client and architect."

After citing the two codes mentioned above, Mr. Pond discussed the matter of accepting the Institute's schedule of charges. He showed how a discrimination should be made between buildings which are merely of structural import and those which call into play all of the material and æsthetic capabilities of the architect.

Referring to the Institute's attitude as affecting the profession Mr. Pond quoted the Board of Directors as reaffirming the belief that the American Institute of Architects is and should continue to be the foremost professional body in the United States. To accomplish this the Board unanimously decided to consider outside of the honorary class no membership which was not purely architectural; while the honorary class should include non-professional men who have with distinction ministered to the art of architecture and such practitioners of sculpture and painting as have demonstrated their fitness to enjoy the privilege. He closed this thought by saying, "I feel that in passing these amendments virtually as recommended by the Board the Institute will strengthen itself within itself and before the public."

In closing Mr. Pond spoke of the paramount ideal of architecture, *the ideal of beauty:* "It must sway in the relations between architect and client, it must color the fraternal intercourse between architects, it must govern in the realm of education."

Reports were read from the Board of Directors and various committees. The directors' report showed a membership of one thousand and eighty-four, as follows: Fellows, three hundred and eleven; associates, six hundred and fifteen; honorary, seventy-two; corresponding members, eighty-six.

The Committee on Education reported through Ralph Adams Cram their plan of a consistent scheme for architectural education. Its aim is "to round out the fine work now being done in drawing and design by such organizations as the Beaux-Arts Society, the Philadelphia T-Square Club and the Boston Architectural Club by equally authoritative training in history, mathematics and construction which has been the object of the committee of this year."

Mr. Cram spoke of the enthusiasm with which the scheme has been accepted at Columbia University; of the extension courses established at the University of Pennsylvania, which work is carried on in consultation with the local Chapter and the T-Square Club; of its success in Boston, and the cordial sympathy of institutions like Harvard, Technology and others.

Mr. Cram condemned the idea of the membership being limited to the eminent architects of mature years. He believes in catching the young student whose close contact with the Institute will make his membership therein inevitable when he comes to the practice of architecture.

In conclusion Mr. Cram emphasized the keynote of the report: "The solidarity of the architectural profession, architects, draftsmen and students; and the raising of the Institute itself to a point where it will command, where now it only deserves, universal recognition as the authoritative and definitive expression of the architectural profession in the United States."

The report of the Committee on the Conservation of National Resources showed the wide and increasingly active interest in this subject and explained how the continued prosperity of the building interests is dependent upon the wise use of the constructional materials.

The report of the Committee on Competitions by Frank Miles Day caused considerable discussion throughout the remaining sessions. He said: "The Institute in its canons of ethics declares that it is unprofessional conduct for any member to take part in any competition, the terms of which are not in harmony with the principles approved by the Institute. In consonance with the canon and as a means of applying it in practice, the Institute at its Forty-third Annual Convention resolved that it should be held unprofessional for any member to take part in any competition, the program of which had not received the formal approval of the Institute. It, therefore, became necessary for the Board of Directors accurately to state the Institute's principles. The statement of them took the form of a circular of advice relative to the conduct of competitions and a code stating the provisions regarded by the Institute as essential to every program."

The code provides that members of the Institute may not enter their plans in competition unless certain rules are observed, such as the employment of an expert adviser to set forth the type of plans desired, the acceptance of a minimum rate, etc.

Mr. Day in answering the many objections as to the mandatory features of the code said: "The committee is of the opinion that the action of the last convention has been of the highest value to the profession; that the circular of advice has greatly diffused a knowledge of the proper way of holding competitions and that the mandatory character of the code has in a few months brought about such an improvement in the conduct of its members as no academic discussion or statement of principles could have brought about in years. The committee is unanimous that the Institute's attitude and the code itself were sound and right and that the only changes needed were of procedure and detail."

Other committees reported as follows: "House Committee," Leon E. Dessez; "Bureau of Fine Arts," S. B. P. Trowbridge; "Institute Seal," H. Van B. Magonigle; "Electrical Code and Fire Protection," C. H. Blackall.

During the afternoon the delegates enjoyed the boundless hospitality of the members of the San Francisco Chapter. After a profitable sightseeing tour of the city luncheon was served at the Cliff House. In the evening a reception was given in the Fairmont Hotel by the local Chapter. Amid the expressions of praise for the cordiality shown to the visiting members a telegram was received and read from President Taft. In his message to the architects in convention President Taft extended his felicitations and congratulations for the great work the Institute has done.

The second day's session was called to order by President Pond. Considerable time was spent in the discussion of the report on competitions as well as on the proposed amendments to the by-laws and constitution. The code of competitions as recommended, opposing competition and favoring direct employment, was adopted.

Under the reports of committees, H. B. Wheelock, on the Committee of Credentials reported fifty-seven delegates present in person and thirty-five by proxy, making a voting power of ninety-two. C. Grant La Farge, chairman of the Committee on the President's Address, reported a general concurrence in the president's views and proposed amendments. C. A. Ziegler, vice-chairman of the Committee on Chapters, reported unusual activity among the majority of the Chapters. After showing how the Chapters in various cities had done much good in acting as experts in municipal and other work, he offered in behalf of the committee the recommendation that all Chapters of the Institute be urged to appoint committees for the "Preservation of Historic Buildings." D. Everett Waid, of the Committee on Resolutions, made a report indorsing a resolution by the San Francisco Chapter which recommends the appointment of a municipal commission for the developing of plans for public improvements on generally harmonious lines. Robert D. Kohn, of the Committee on Reports of Special Committees, recommended the continuation of the Committee on Conservation, and the establishment of a Committee on Fire Protection, to work with the National Fire Association.

Following the business meeting of the morning the architects became the guests of the Oakland Chamber of Commerce. The representatives of the Oakland organization met the delegates at Key Route Inn where luncheon was served. A. A. Denison, secretary of the Chamber of Commerce, welcomed the architects in the name of the city of Oakland. Following the luncheon the delegates were taken in automobiles about Oakland, after which the Institute assembled in the Greek Theater of the University of California. A hearty welcome was extended to the visiting architects by the president of the State University.

The third day's session was called to order by President Pond at 10 A.M. Wednesday, January 19th.

After considerable discussion the following amendment was adopted together with many others: "No person shall be eligible to membership in the Institute unless he be at the time a member of a Chapter, provided that a Chapter exists in the territory in which he resides. No member of the Institute shall be an Institute member of more than one Chapter." A resolution was passed to devise means for the preservation and restoration of the ancient Franciscan buildings of California. A motion was carried to establish a Committee on Civic Design.

At the afternoon session J. Pickering Putnam of Boston presented a paper on "Plumbing." After the reading of this paper the report of the tellers announced the following elections: Irving K. Pond, president; Walter Cook, first vice-president; E. M. Wheelwright, second vice-president; Glenn Brown, secretary and treasurer; Thomas R. Kimball, Milton B. Medary, Jr., and A. F. Rosenheim, directors for three years. Sixteen architects were elected Fellows of the Institute. Following the announcement of the tellers Arthur B. Benton read a paper on "The Missions of Old California."

In the closing moments of the convention resolutions were adopted giving thanks to the Illinois, Colorado, San Francisco and Southern California Chapters, who have and who will entertain the Institute in its present excursion and convention. The recommendation of the Board of Directors that a gold medal of the American Institute of Architects be conferred upon George B. Post was passed. After a few remarks by the various members the convention adjourned with three rousing cheers for the San Francisco Chapter.

The banquet tendered at the Fairmont Hotel Thursday evening by the San Francisco Chapter to the visiting delegates concluded the entertainment extended by their California hosts. William Mooser, president of the San Francisco Chapter, extended a most cordial greeting to the delegates.

In response to a toast C. Grant La Farge of New York said: "There is something of singular inspiration to a man of our older and, perhaps, more limited eastern communities, in coming thus across the vast distance of our great country — miles which separate us geographically and yet are but a long and splendid link in our essential brotherhood." Other speakers of the evening, who paid a tribute to the genius of the modern American architect, were Right Rev. William Ford Nichols, D.D.; Irving K. Pond, president of the Institute; Ralph Adams Cram; Frank D. Hudson; Prof. C. B. Wing; Charles W. Hornick, and Frank T. Shea.

Plate Illustrations—Description.

Grace Hall and Dormitories, Williamstown, Mass. Plates 15–19. This group of buildings will consist of a large hall and two dormitories. Grace Hall, which is given as a memorial by Mr. Alfred C. Chapin, will have an approach from the south by an avenue 100 feet wide with tall elms growing on either side. The exterior design calls for a colonnade of six monolithic columns crowned by a pediment whose tympanum will accommodate a future work of statuary. The building will have a granite base, walls of dark red sand struck brick, and cornice and balustrade of stone. All entrances will have carved stone doorways, three of which constituting the main entrance will be richly carved and have ornamented wood doors. The windows on the sides and front will have moulded and carved stone treatment. Upon the interior the walls of the lobby will be treated in quarter sawed oak and the ceiling in ornamented plaster. The stair halls will have paneled walls and ornamented ceilings in plaster. The auditorium will be designed in quarter sawed oak to the top of the gallery balustrades, above which will be ornamented and paneled plaster. The benches at the sides of the auditorium will also be of quarter sawed oak, having a parapet of the same material in front of them with panels ornamented and pierced. The floor will have wide teak wood strips alternating with narrow ones of rosewood. The soffit of the gallery will be of paneled wood and the wainscot of wood painted white. The ceiling of the auditorium will be painted in two tones of gray. Two trap doors are planned for the removal of the seats to a basement storage room. The stage will have quarter sawed oak on the walls to the top of the cornice; teak wood floors in fancy pattern, and an oriental tapestry filling a large panel. The president's room will have a wood wainscot, wood mantel with marble facing, plaster paneled walls and ornamented ceiling. The organ will be directly over the north end of the stage and installed so that the music will come partly from an opening back of the stage and partly from pierced grilles over the proscenium lintel. There will be a large club room in the basement directly under the stage which will have a wainscot of paneled wood and a plaster treatment above.

Gymnasium, Mount Hermon, Mass. Plate 20. This building is built of Harvard brick with dressed basement walls and Vermont marble trimmings. The main cornice is of wood, the roof of slate and the cupola of copper. Upon the interior the walls are faced with light colored brick. The main gymnasium is 50 feet by 120 feet with the running track suspended from roof trusses. The total cost of the building with the electric fixtures, but exclusive of gymnasium apparatus, lockers and other furnishings, was approximately $79,000. The cubage of the building taken from finished cellar floor to surfaces of roofs, is 350,000 cubic feet, making the cost per cubic foot about 22½ cents.

Central Y. W. C. A. Building, Pittsburg, Pa. Plates 26, 27. This building has an exterior finish of light colored brick with terra cotta trimmings. The main feature on the interior is the lobby which opens to the top of the second floor, has a mosaic tile floor, and a balcony running around the sides. The woodwork in the lobby is of fumed oak, as it is throughout the building. The basement plan provides for a swimming pool, dressing rooms, baths, laundry and an emergency room; while a sub-basement takes care of the heating, ventilating and electrical apparatus, a pumping station, a refrigerating plant and filter. The second floor accommodates a library, an extension department, offices, class rooms, and a designing room; while the third floor is occupied by the domestic art and domestic science departments. Over the sixth floor are located single rooms for the help. A roof terrace is placed above the dining room, and connected with the kitchen by elevators in order to furnish meals there in the summer. In addition to the regular fire escape there is a fire tower, separate from the main building but accessible from every floor. The total cost of the building, including architect's commission was $310,000. The general contract amounted to $176,000; the mechanical equipment including plumbing, heating, lighting and power plant, $72,000; the balance being used for wrecking, structural steel, kitchen and laundry equipment, refrigerators, light fixtures and miscellaneous items.

Editorial Comment and Miscellany.

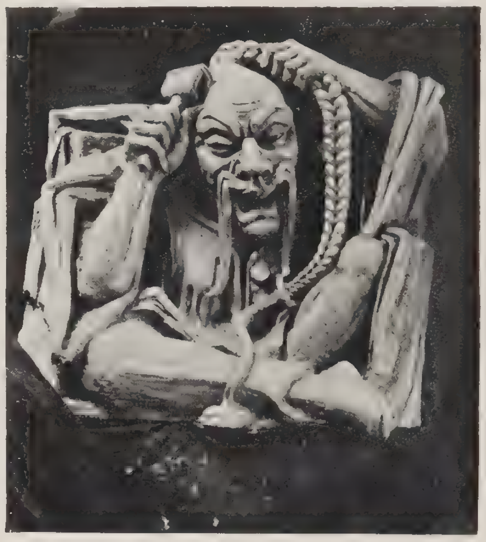
THE CONVENTION.

THE convention of the Institute held in San Francisco in January, 1911, differentiates itself from all other recent conventions in that, by the very nature of the case, it was primarily an affair of good-fellowship. This element has never been lacking in the past, but hitherto, for one reason and another, legislation has been to the fore and the conventions, particularly those in Washington, have been marked more by consistent hard work than by social considerations. The San Francisco Convention inevitably took on a different color, and it was well for the Institute that it did so. Important as are legislation and the listening to scholarly papers, the fusing of the whole profession into one through the meeting on a common ground of representatives from far separated and widely different communities is of quite equal importance — as has always been realized by those who in Cleveland, Chicago and Washington, have annually come into touch with their fellows from the South, the Middle West and the Coast. Every man from every Chapter brings to each convention something that every other member needs, and no section of the country—considering its geographical distance—has been more faithful in its attendance, and at great personal inconvenience and expense, or more generous in

its contribution of valuable personality, than has the Pacific Coast.

It was only justice, therefore, that at last the mountain should go to Mahomet, and that the Coast should for once be host at its own hearthstone, rather than guest at the far-away board of the East.

If there are any regrets they must be sought in California, the East has none to entertain. Elaborate, carefully considered arrangements had been made for the transportation of the delegates across the continent, and these were carried out without a break and in a most astonishingly satisfactory manner. A comfortable and even luxurious special train was provided by the Chicago and Northwestern R. R.; the agent who "personally conducted" the pilgrimage was a model of inconspicuous but efficient solicitude, the conductors were patient and cheerful, the porters devoid of the occasional arrogance of their kind, the food (etc.) excellent, varied and ample, though it was rumored that had the train been delayed a day in the snows of the Sierras, the "etc." would have been diminished to a point where it would have been necessary to put the passengers on half rations.



DETAILS OF FACTORY BUILDING, NEW YORK CITY.
Executed by the South Amboy Terra Cotta Company.
Shire & Kaufman, Architects.

From Chicago across the Plains to Denver the trip was uneventful, except for the incessant labors of many committees and the furtive preparation of notes for extemporaneous and unexpected speeches by various private individuals. At Denver came the first experience with the near-West. Dazzling, snow-covered mountains rose like a rampart along a vigorous and enthusiastic city that produced an astonishing sequence of "seeing Denver" motors in which the delegates did it. In the evening the Denver Chapter was host at a fine banquet and at 2 A.M. the train — with a still intact quota — started south for its serpentine trip through the Rockies. This trip through the Grand Cañon of the Arkansas was a revelation of impossible painted mountains followed by wide snow-fields that faded away and gave place to the gray deserts and the lavender and white ranges that lie around Salt Lake City. Here admiration was divided between a city really beautiful in itself, the great organ in the Tabernacle (whereon much popular music "arranged" for this instrument was excellently played) and the astonishing ability of the ignorant and untrained old builders of the Tabernacle, to create an edifice that was a model of acoustics and construction.

ENTRANCE TO CHELSEA CITY HALL,
CHELSEA, MASS.
Executed in terra cotta by the New Jersey Terra Cotta Company.
Peabody & Stearns, Architects.

Beyond Salt Lake lay the long climb into the fastnesses of the Sierras. A cooling and salutary snow lay deep at Reno and there was word there that the passes were blocked with 12 feet thereof. At the moment, however, trains delayed forty-eight hours began to come in and the "Architects Special" advanced intrepidly into the white wilderness. Twelve feet of snow there was indeed; the mountain villages were practically extinguished, as were some of the delegates who ventured out with their kodaks at the not infrequent stops; sections of the forty miles of snowsheds had been carried away by avalanches and the train crept cautiously around the wild curves of the road in the midst of whirling snow. It was a world entirely white, mountains, trees, sky. Past the summit there came a long swinging coast down through a violet valley, around "Cape Horn," and then, at sunset, the level plain. At 3 o'clock we were in 12 feet of snow; at 6 girls with no hats and wearing shirtwaists were visible, with green grass under their feet; and at 10 P.M. two palm trees waved a welcome at Berkeley.

The anticipated hospitality of the Coast made its appearance with the shirtwaist girls, for at a way station (was it Poker Flat?) an outbound train transferred to the special one carload of roses, violets, daffodils, smilax, and branches of orange, lemon and palm. The dining car was transferred into a genuine palm-garden and the ladies of the party were overwhelmed with the scented greetings of California.

DETAIL OF THE GEORGE M. COHAN'S THEATRE, BROADWAY AND 43D STREET, NEW YORK CITY.
Terra cotta executed by the Atlantic Terra Cotta Company.
George Keister, Architect.

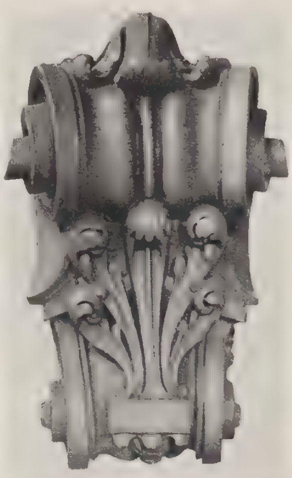
At first sight San Francisco looked surprisingly familiar; here was the well remembered "Ferry Building" and there in the distance the Call Building, with its lofty dome. All between and around was a solid and mature mass of business blocks, with no gaps, no vacant lots scored by crags of fire-scarred masonry. Down town it was as though the earthquake and fire had never been and the impression was simply that San Francisco was merely a little better off in point of commercial architecture than one remembered to have been the case. All was changed, however, as soon as one began the ascent of Nob Hill by one of the Alpine gradients that surely prove the city to be the most insanely planned of any in Christendom. Here were ruins enough and to spare, some of them vine-clad and startlingly picturesque, others gaunt and ominous in their forelorn abandonment. Along California street on the heights where the Fairmont Hotel lifts its enormous bulk, there is for several blocks, almost no rebuilding whatever, so far as the south side is concerned, and one is tempted to hope this always may remain the case, the view across the city

TRUMBULL SCHOOL, CHICAGO.
Brick by The Ohio Mining and Manufacturing Co., furnished by Thomas Moulding Company.
Dwight H. Perkins, Architect.

far below is so fine. To the north is one of the shocks of the rebuilding — miles, it seems, of cheap, three-story tenements, crowded close together, and all of wood. They told us the fireproof limits had been greatly widened, but as the eye swept the rolling miles of flimsy and inflammable tenements one wondered if the next great disaster in San Francisco would be as great as the last, or only second to it in its magnitude. This, and the failure to take any steps whatever to remedy the scandal of the preposterous plan — let alone the question of working out some minor part of the splendid scheme of civic improvements for which the fire seemed to make Providential provision, was the only real disappointment one could feel in the Phœnix City, and even this was forgotten for the moment in the light of the miraculous rehabilitation in four years of a great metropolis wiped out of existence and again restored.

RANDALL SCHOOL, MADISON, WIS.
Roofed with tile made by the Ludowici-Celadon Company.
Lew Porter, Architect.

Some Chapters were not represented at all and others but slenderly. New York came nobly to the fore with a big delegation. Boston could muster but three out of its quota of eleven, and two of these were directors. Philadelphia did better, but on the whole there was anything but a just numerical representation of the whole country. Naturally, therefore, business took the form of carefully digested committee reports, approval in principle of the several propositions, and a referring back to the Board for further consideration or final action.



DETAIL BY THE WINKLE TERRA COTTA COMPANY.

The formal functions came to an end with much good food and more good language on Thursday night when the San Francisco Chapter gave its great banquet for the members and guests of the convention; the speeches of the Bishop of California, Dr. Benjamin Ide Wheeler, and the Hon. James I. Phelan were particularly notable; unfortunately, Mr. La Farge was prevented from reading the speech he had prepared, but it has been printed in full and therefore is not lost. Its deep thought and clear vision serve to show those who were present at the banquet how much they lost — though fortunately only for the moment.

INTERIOR OF BERITH KODESH TEMPLE, ROCHESTER, N. Y.
Interior walls faced with Roman brick made by the Ironclay Brick Company.
Leon Stern, Architect.

It was a great convention, and great because it revealed the West to the East, and the East to the West; because it made each man realize that the other had something of personality and impulse that he could not get along without. There are scores of men happier to-day for the friendships revived or created, than a short month ago; the West retains and the East brings back a new inspiration in architecture, and the nation is better off because a few hundred of its citizens have found out how large it is, how compounded of different elements, and how indispensable each one of these is to the other.

CONVENTION OF BRICK MAKERS.

THE annual meeting of the Building Brick Association of America was held in the Hotel Seelbach, Louisville, Ky., February 7th, 8th and 9th. The meeting was largely attended by leading clay workers, who planned a campaign in behalf of brick as a building material which is likely to be felt throughout the country. The work of the association has been directed largely to an investigation to determine the comparative cost of brick construction with other materials, and the creation of a wholesome literature setting forth the value of brick, considered æsthetically or constructively.

The following officers were elected for the ensuing year: President, R. L. Queisser, Cleveland; vice-president, Ralph Simpkins, St. Louis; secretary-treasurer, Parker Fiske, New York. There are twenty-seven directors of the association, the majority of whom are the leading manufacturers of building brick in this country.

IN GENERAL.

The American Academy in Rome announces competitions for the Prizes of Rome in Architecture,

DETAIL OVER ENTRANCE OF HOTEL.
Executed by The Northwestern Terra Cotta Company.
Marshall & Fox, Architects.

Sculpture and Painting. Persons wishing to take part in the competitions must make written application to the secretary of the Academy, Francis D. Millet, 6 East 23d street, New York City, not later than March 15, 1911.

The National Brick and Clay Products Exhibition will be held in Chicago during January, 1912. The various branches of the clay industry of this country will be fittingly represented at this exhibition. Further announcement will be made in these columns when the whole program has been developed.

E. Roy Sholes & Co., architects, have opened offices at 171 Washington street, Chicago.

DETAIL OF PUBLIC SCHOOL NO. 19, BROOKLYN, N. Y.
Executed by Brick, Terra Cotta & Tile Company.
C. B. J. Snyder, Architect.

Louis Boucherle, and son Paul, have formed a partnership for the practice of architecture, with offices in the Stambaugh Building, Youngstown, Ohio.

Theo. C. Kistner, architect, has opened an office at 1047 Fifth street, San Diego, Cal. Manufacturers' samples and catalogues desired.

Mauran & Russell would be pleased to receive manufacturers' catalogues and samples at their Houston, Texas, office, 930 Chronicle Building.

William D. Hewitt, Alfred H. Granger and Phineas E. Paist have formed a partnership for the practice of architecture under the name of Hewitt, Granger & Paist, with offices at 671 Bullitt Building, Philadelphia.

Vonnegut and Bohn, architects, 610 Trust Building, Indianapolis, announce that Kurt Vonnegut and Otto N. Mueller have become members of the above mentioned firm.

Arthur R. Koch and Charles C. Wagner have formed a co-partnership for the practice of architecture under the firm name of Koch & Wagner, with offices at 26 Court street, Brooklyn.

Charles S. Frost and Alfred H. Granger, architects, announce the dissolution of their partnership. Mr. Frost will continue the practice of architecture at the present address, 181 La Salle street, Chicago.

APARTMENT HOUSE, NEW YORK CITY.
Terra cotta furnished by the New York Architectural Terra Cotta Company.
Waid & Willaner, Architects.

Thomas W. Lamb, architect, announces the removal of his offices to 501 Fifth avenue, New York City.

Verus T. Ritter, architect, has opened an office in the Ritter Building, Huntington, West Va. Mr. Ritter is also a member of the firm of Ritter & Stetler, architects, 17 West Third street, Williamsport, Pa.

A. Raymond Ellis has been chosen architect for the new Heublein Hotel to be erected at Hartford, Conn., at a cost of $1,000,000. Mr. Ellis was a competitor in the competition for a hotel recently conducted by THE BRICKBUILDER.

Eli Benedict, architect, will continue to conduct for the coming season classes in architectural drawing, plan reading and estimating, at the night school of the Y. M. C. A., West 23d street, New York City. Mr. Benedict also gives individual atelier instruction at his offices 1947 Broadway.

The Atlantic Terra Cotta Company will furnish architectural terra cotta for the following new buildings: East River Bank, New York City, Clinton Russell, architects; Knickerbocker Trust Building, New York City,

McKim, Mead & White, architects; State Educational Building, Albany, Palmer & Hornbostel, architects; Southern Building, Washington, D. C., D. H. Burnham & Co., architects; Athletic Club, Pittsburg, exterior of building and swimming pool, Janssen & Abbott, architects; Psycopathic Hospital, Boston, Kendall, Taylor & Co., architects; Bevier Memorial, Rochester, N. Y. Claude Bragdon, architect.

DETAIL OF BANK, UNION, N. J.
Executed by the Conkling-Armstrong Terra Cotta Company.
Crow, Lewis & Wickenhoefer, Architects.

Linoleum and cork carpet, which is secured by waterproof glue to cement and other kinds of floors, is being supplied by John H. Pray & Sons Co., Boston, not only to many of the new government buildings, hotels, theaters, churches, hospitals, clubs and other types of public and semi-public buildings, but to older buildings of the classes mentioned as well.

Stephen B. Goossen and Norman H. Feldmann, architects, have formed a co-partnership and taken offices in the Chamber of Commerce, Detroit. Manufacturers' samples and catalogues desired.

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FEBRUARY, 1911.

PROGRAM WHICH GOVERNED THE COMPETITION FOR A HOTEL IN AN AMERICAN CITY OF MODERATE SIZE.

FIRST PRIZE, $500. **SECOND PRIZE, $250.** **THIRD PRIZE, $150.**
FOURTH PRIZE, $100. **HONORABLE MENTIONS.**

THE problem is a HOTEL OF MEDIUM SIZE, planned to meet the ordinary demands of a small American city. The site is assumed to be at the corner of two intersecting streets; the lot ample in size to accommodate the building and practically level.

The size and shape of the building are left entirely to the designer, except that not less than one hundred and not more than one hundred and twenty-five sleeping rooms are to be provided above the second floor. At least one-half of the sleeping rooms are to have bathrooms and the others may be provided with toilet and shower accommodations.

The ground or first floor plan is to provide the usual accommodations which are necessary in a hotel of this size.

The second floor plan may be given over in whole or in part for family suites, reception rooms, small meeting rooms, etc., etc.

The upper floor plan should provide for a large social hall to be used for banquets, dances, and similar functions. In connection with this social hall, and on the same floor, there should be provided suitable reception rooms, coat rooms, smoke room, service rooms, toilet rooms, etc., etc.

A roof garden may or may not be incorporated in the design.

It is assumed that the basement plan provides the necessary space for mechanical equipment, storage rooms, kitchen, lavatories, barber shop, and perhaps a rathskeller, but the plan of this floor is not required.

The exterior of the building is to be designed entirely in architectural terra cotta, and it is suggested that at least portions of the walls be treated in color.

The chief object of this competition is to encourage the study of the use of architectural terra cotta. There is no limit set on the cost of the building, but the design must be suitable for the character of the building and for the material in which it is to be executed.

The following points will be considered in judging the designs:

A. The general excellence of the design and its adaptability to the prescribed material.
B. The intelligence shown in the constructive use of architectural terra cotta.
C. Excellence of plan.

DRAWINGS REQUIRED.

On one sheet, the principal elevation drawn at a scale of 8 feet to the inch. On the same sheet, the first and second floor plans, a typical bedroom plan, and the upper floor plan, drawn at a scale of 16 feet to the inch; also a small sketch plan of the roof garden if that feature is provided for. On this same sheet, if space permits, give sketch of an interesting interior.

On a second sheet, the elevation of secondary importance drawn at a scale of 16 feet to the inch, and a sufficient number of exterior details drawn at a scale of ½ inch to the foot to fill the sheet.

The details should indicate in a general way the jointing of the terra cotta and the sizes of the blocks. The color scheme is to be indicated either by a key or a series of notes printed on one of the sheets.

The size of each sheet (there are to be but two) shall be exactly 36 inches by 24 inches. Strong border lines are to be drawn on both sheets, 1 inch from edges, giving a space inside the border lines 34 inches by 22 inches. The sheets are to be of white paper and unmounted.

All drawings are to be in black ink, without wash or color, except that the walls on the plans and in the sections may be blacked-in or cross-hatched.

Graphic scales to be on all drawings.

Each set of drawings is to be signed by a *nom de plume*, or device, and accompanying same is to be a sealed envelope with the *nom de plume* on the exterior and containing the true name and address of the contestant.

The drawings are to be delivered flat, or rolled (packaged so as to prevent creasing or crushing) at the office of THE BRICKBUILDER, 85 Water Street, Boston, Mass., charges prepaid, on or before January 16, 1911.

Drawings submitted in this competition must be at owner's risk from the time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. Those who wish their drawings returned may have them by enclosing in the sealed envelopes containing their names, ten cents in stamps.

The designs will be judged by three or five well-known members of the architectural profession.

For the design placed first in this competition there will be given a prize of $500.
For the design placed second a prize of $250.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

The manufacturers of architectural terra cotta are patrons of this competition.
The competition is open to everyone.

Terra Cotta Entrance, Church of S. Caterina
Bologna, Italy

H·G·RIPLEY·05·

Report of the Jury of Award

IT IS hardly possible to begin a report on this year's award better than by quoting the opening paragraph of the report of the jury of last year:

In looking over the drawings submitted in this competition we were impressed with the interest and industry shown by the great majority of the competitors on the one hand, and with the dead level of mediocrity and lack of invention displayed by most of them on the other. With the exceptions mentioned later, the drawings showed too close an adherence to historical forms, regardless of their fitness in expressing the nature and possibilities of terra cotta as a building material and a decorative medium, and it may be fairly said that the competitors appear to have been hampered not only by too strict an adherence to precedent, good, bad and indifferent, but by too close reference to the work done in similar competitions which have been held under the same auspices in the past.

These faults and weaknesses in terra cotta design are, however, so generally characteristic of the past and current practice of those architects able to employ draftsmen sufficiently skilled to be eligible for such competitions, that perhaps the training and influences which surround them are more to be criticized than the draftsmen themselves.

Such adverse criticism as here appears is therefore offered in the spirit of helpfulness, suggestion and appreciation.

It is to be hoped that the men entering these competitions will think seriously, to begin with, of the nature and character of the material specified and not plunge into the preparation of designs, however good, which are, obviously, stone in their essence and terra cotta only in the treatment of wall surfaces or perhaps in a superabundance of ornament.

First Prize: This design is placed first because it seems to represent more nearly than any other an intrinsically terra cotta building. Such forms, the cornice for example, would hardly suggest themselves in stone.

The design has the character of a hotel and is good in mass; the side elevation is particularly successful. In detail the upper story is entirely out of scale with the lower — an almost habitual fault in our stone architecture — and the balcony and cornice bands are clumsy. The plan is straightforward and the small section well indicated.

Second Prize: This design seems to us to be in better taste and general scale than that placed first. It is, however, with the single exception of a clever wall texture a stone design. The entrance is distinctly stone with its unbroken column shafts and its crowning block parapet. Moreover, a plan which allows the whole corner of the building to come down unsupported in the middle of a room is inadmissible in a competition of this character even if feasible in reality.

Third Prize: To be commended as good in general mass and as showing refinement and a knowledge of scale. It has a logical plan but the design lacks originality, has an unfortunate side elevation, and is uninteresting in detail.

Fourth Prize: A good terra cotta design, suitable to the purpose, charmingly presented; the detail exceptionally good. Its plain surfaces are a mistake and the windows are large for a material which must be used in small units.

First Mention: A rather pretentious design having a good hotel character. It is not, however, essentially terra cotta; the detail is indifferently drawn and the plans wasteful. The general mass and scale of the façade is good, but the first floor corners are weak.

Second Mention: A well-balanced design; would make a good building. While it has more the character of a club-house than a hotel it is unusually interesting in treatment. The details suggest terra cotta only by some of the jointing.

Third Mention: Interesting as a logical treatment of the material; good general scale, and in detail this design indicates admirably in façade the arrangement of its plans.

Fourth Mention: A design showing some ability, not adapted to terra cotta, its wide truncated corner would be unfortunate in reality. The fluted columns of this entrance porch are the last things to attempt in the requisite material.

Fifth Mention: A straightforward façade, stone in character, dry in detail, well designed, well drawn, it shows no conception of the peculiar characteristics of burnt clay.

Sixth Mention: While stone in general character this design attempts in detail to fulfil the requirements of the material. It looks a hotel and the somewhat top-heavy crowning motif good in scale and mass.

In conclusion we suggest that each competitor for next year ask himself to begin with: Is my conception terra cotta, intrinsically and unmistakably terra cotta and not stone ornamented; second, is the design good in mass, in scale, in detail; third, is it right in plan, and lastly, how would it look built?

These ten designs show an ability which, if thoughtfully directed, should present far more satisfactory results.

Criticism of Plans by Mr. Hardenbergh

The program of the Committee is not sufficiently explicit as to plot to be occupied.

The competitors have naturally taken advantage of this in the majority of cases by assuming that the building will have light on all sides, a condition not likely to occur in a city of the size to warrant such a hotel as that called for. The more difficult problem of lighting from two, or at most, three sides should therefore entitle the competitor to due credit.

First Prize: Lighted on all sides. A good example of an Academic plan, but space on main floor is sacrificed to artistic conditions; on typical floor the arrangement of closets is wasteful.

Second Prize: Lighted on two sides only. Thoroughly practical arrangement on ground floor; on typical not so good, the court opening to front not being as satisfactory either architecturally or in lighting building, as if joined to uncovered area at rear.

Third Prize: Lighted on two sides only. Good practical plan but mistake made in not covering whole area on ground floor; typical floor, arrangement of closets in relation to bedrooms not fortunate, otherwise good.

Fourth Prize: Lighted on all sides. Good architectural ground floor but not thoroughly practical as to needs of hotel, such as office, service, etc. Typical floor good but court unnecessarily wide for building having unobstructed light.

First Mention: Lighted on all sides, possibly on three only. Unfortunate arrangement of light courts; plan not carefully studied for either floor.

Second Mention: Lighted on four sides. Good straightforward plan of ground and typical floors; lobby somewhat excessive in size.

Third Mention: Lighted on four sides. Interesting plan of ground floor; typical, not so carefully studied as to baths and closets.

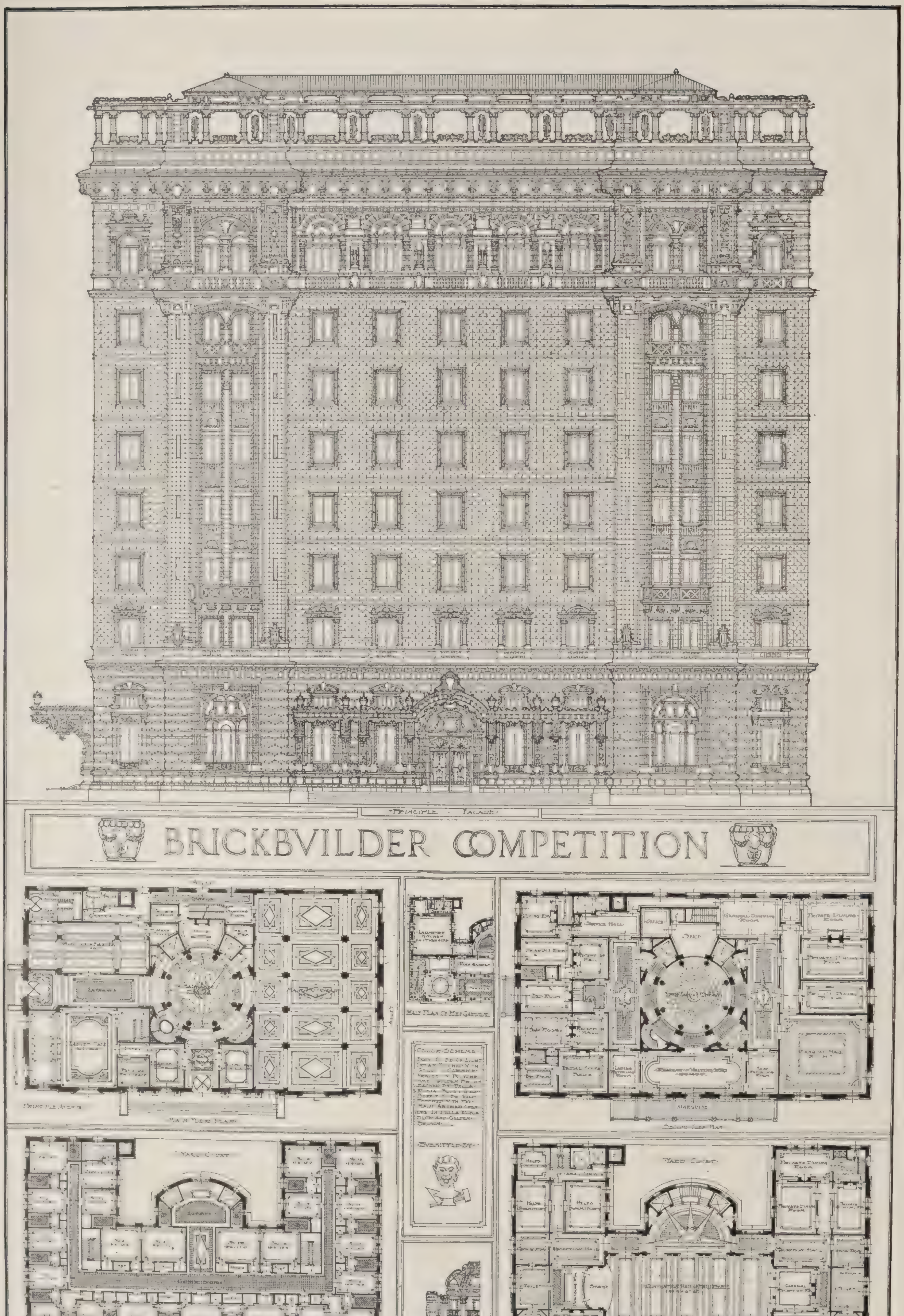
Fourth Mention: Lighted on three sides. Arrangement of ground floor forced and not altogether happy. On typical floors, court too large for area.

Fifth Mention: Lighted on three sides. Plan commonplace for both floors, not very carefully studied.

Sixth Mention: Lighted on four sides although windows not necessary on rear. Plan of both floors practical and good, showing fair understanding of requirements.

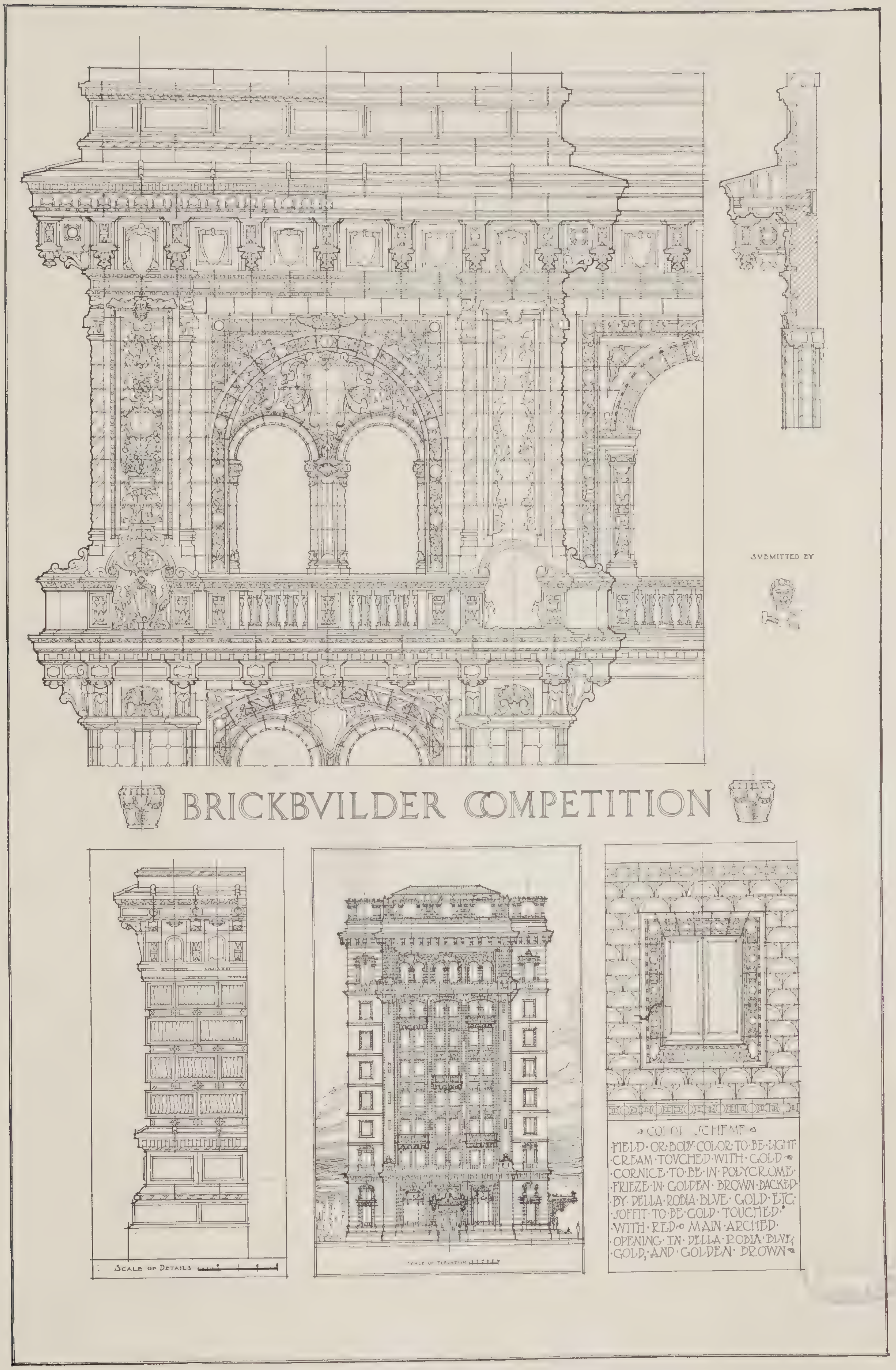
Donn Barber,
Arnold W. Brunner,
H. J. Hardenbergh,
Benjamin Wister Morris,
Philip Sawyer,
Jury of Award.

After the Prize and Mention Designs no attempt has been made to arrange the others in the order of their merit.

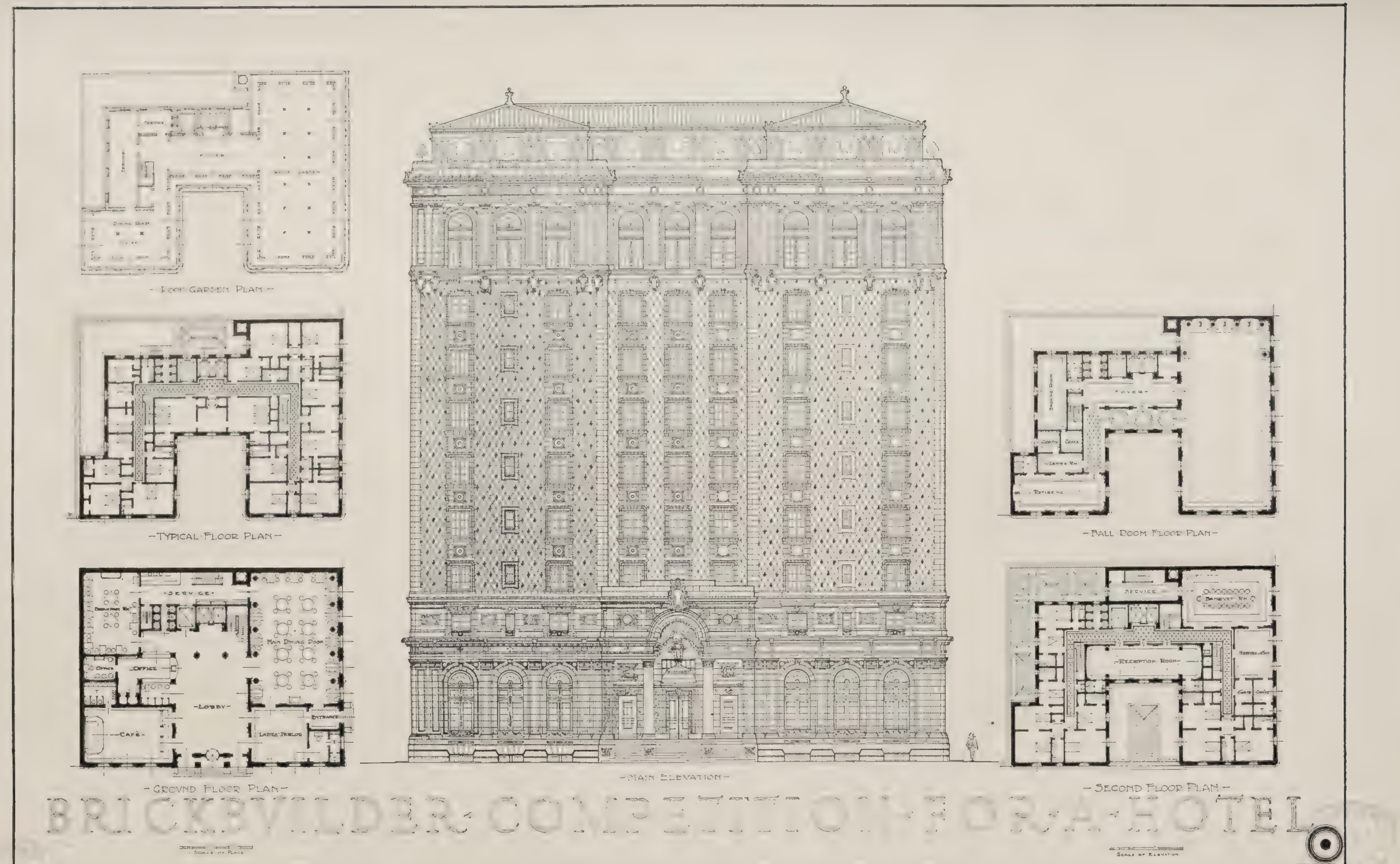


FIRST PRIZE DESIGN

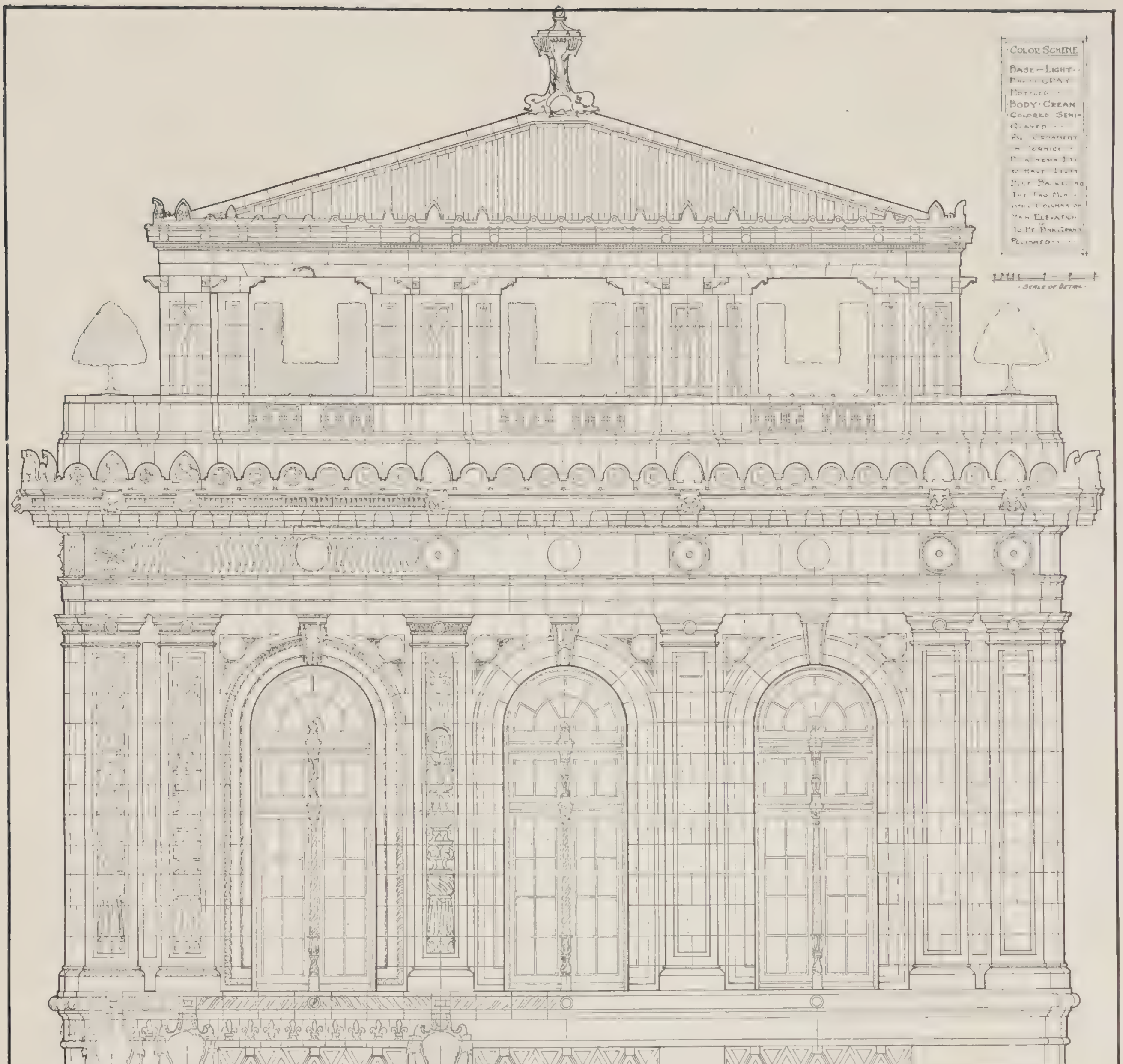
Submitted by William La Zinsk and Dwight James Baum, New York City



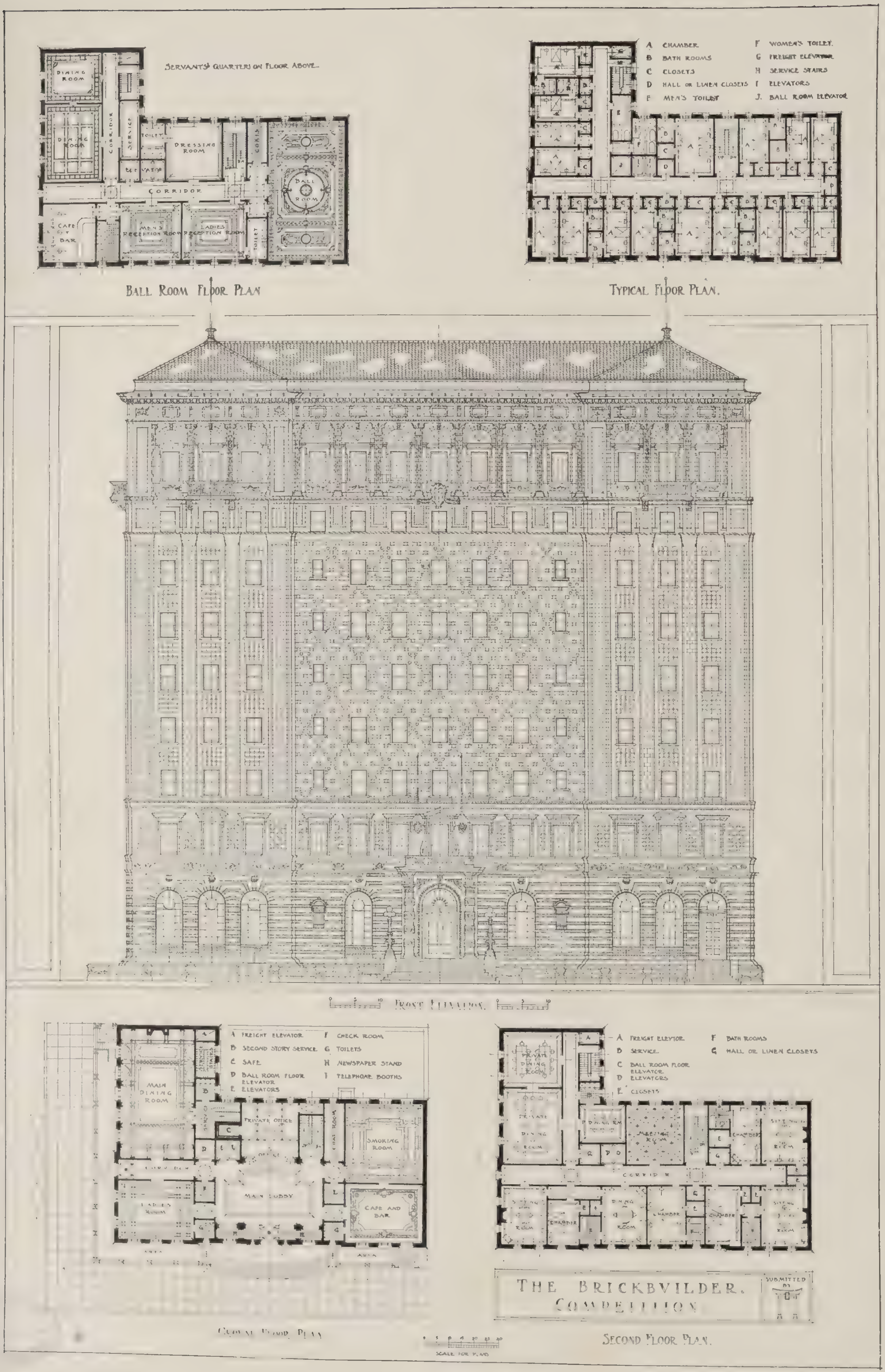
DETAILS BY WILLIAM LA ZINSK AND DWIGHT JAMES BAUM, NEW YORK CITY



SECOND PRIZE
Submitted by Henry Ihmsen Hellmuth and Charles H. Conrad, New York City.

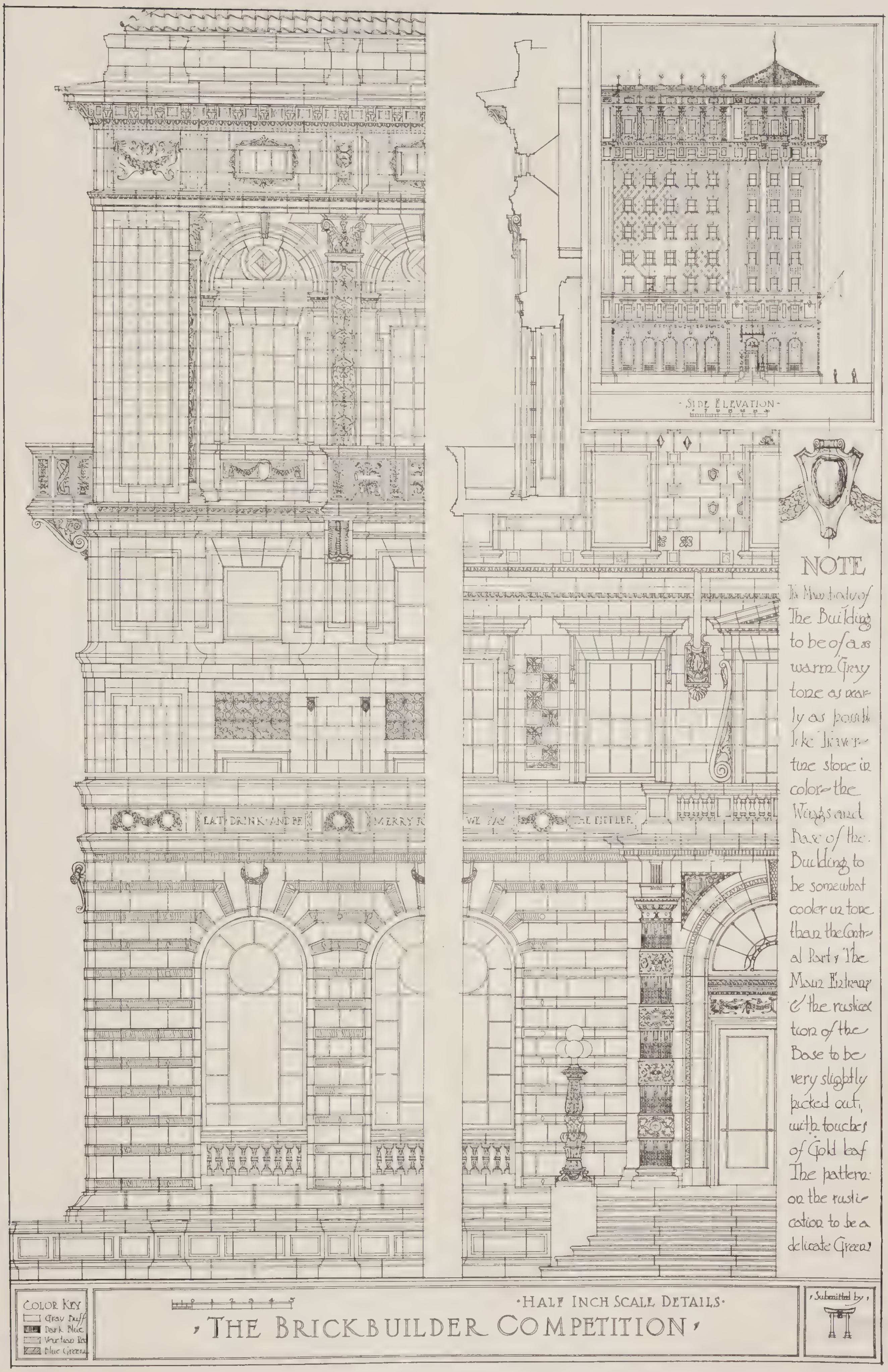


DETAILS BY HENRY IHMSEN HELLMUTH AND CHARLES H. CONRAD, NEW YORK CITY

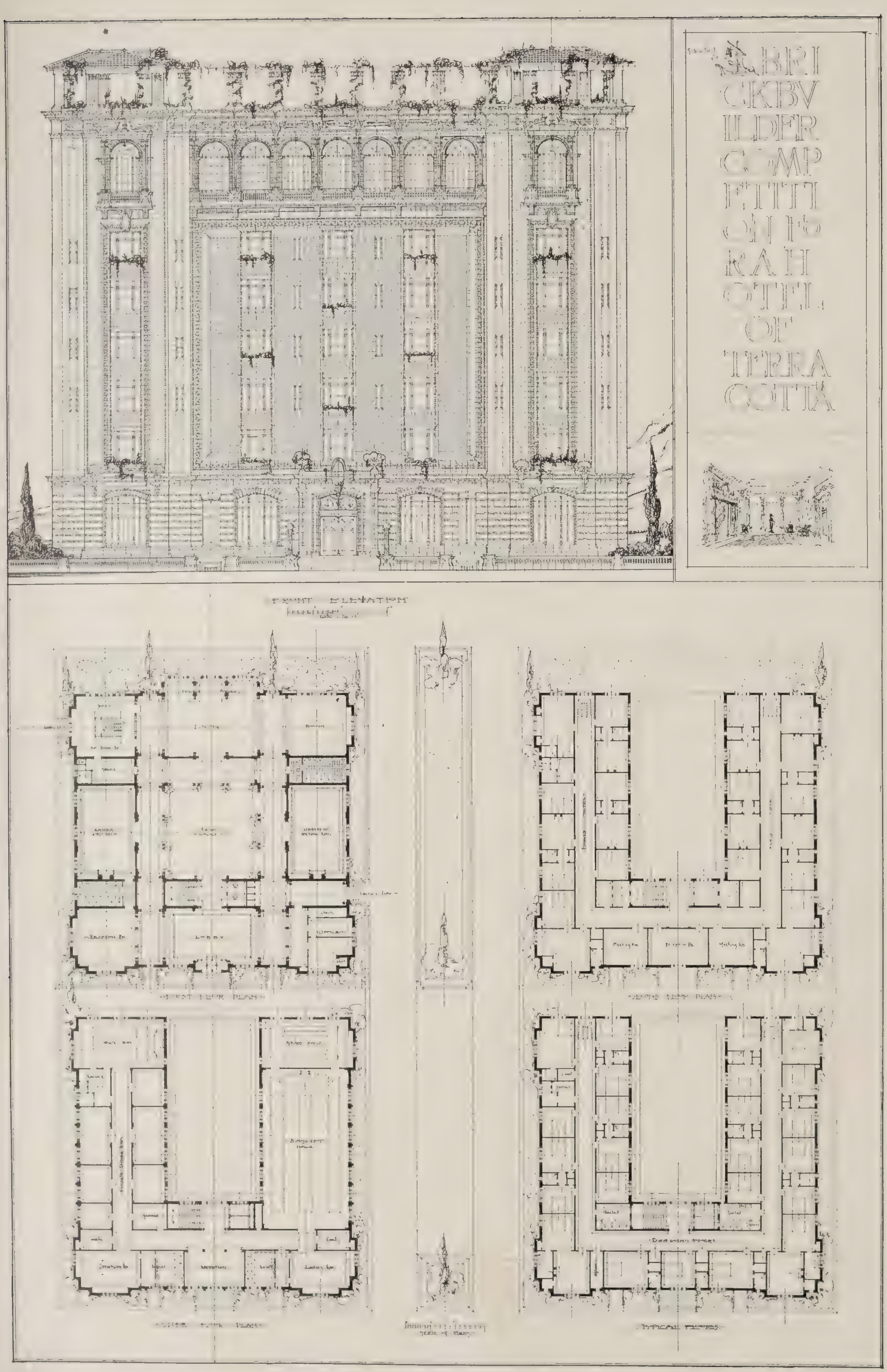


THIRD PRIZE DESIGN

Submitted by C. H. Dittmer and C. D. Loomis, New York City

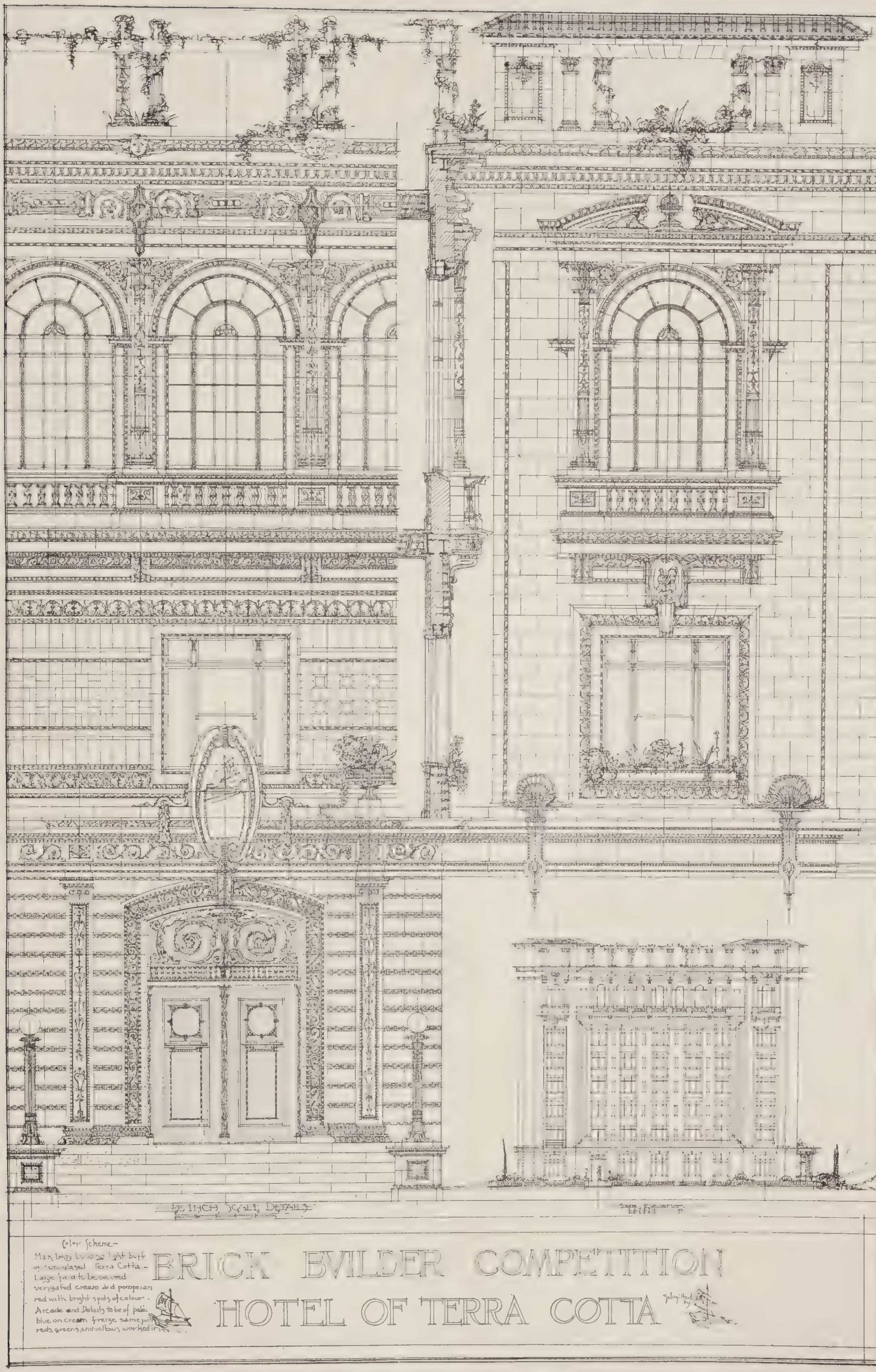


DETAILS BY C. H. DITTMER AND C. D. LOOMIS, NEW YORK CITY

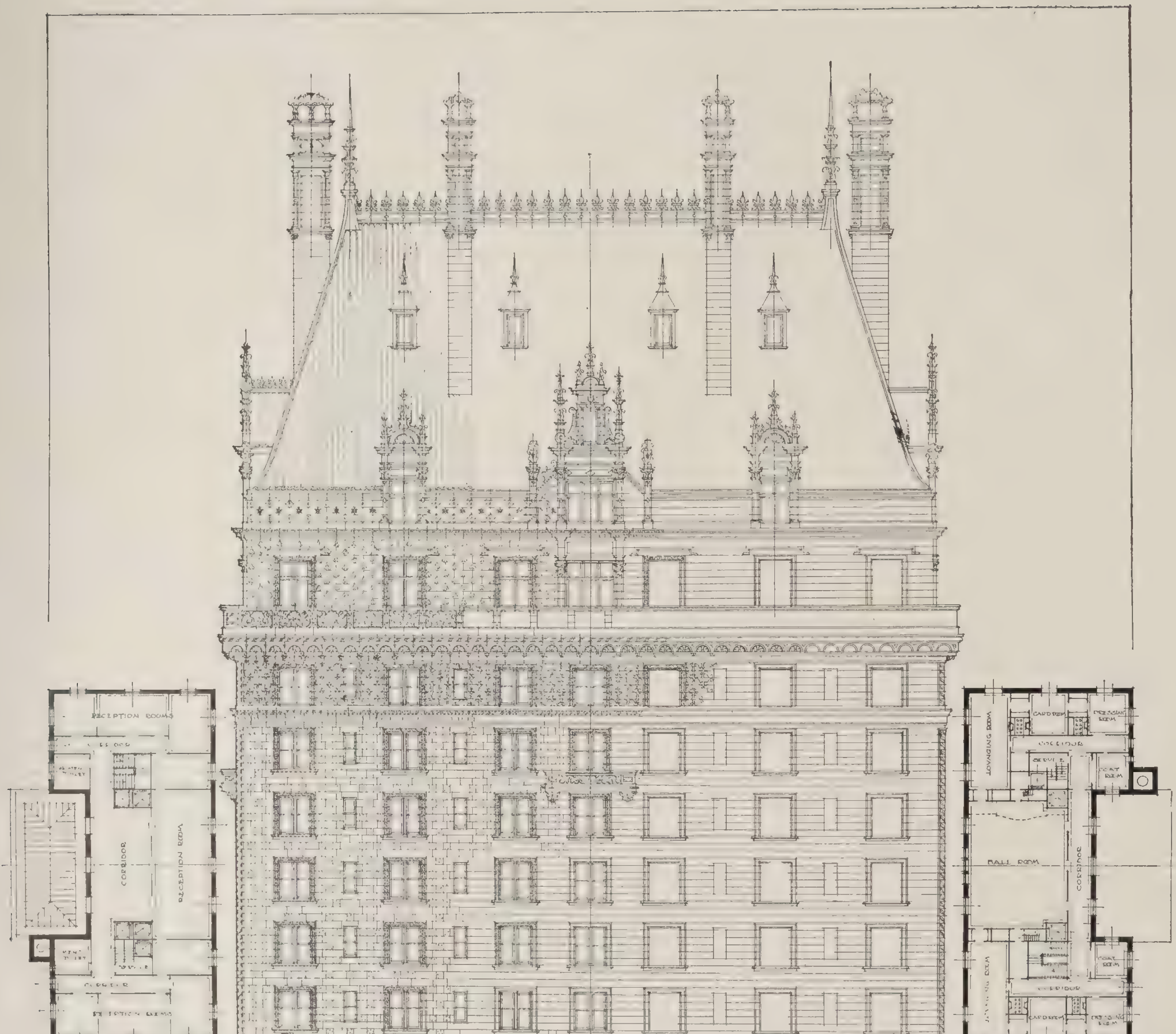


FOURTH PRIZE DESIGN

Submitted by Frederick J. Larson, Boston, Mass.

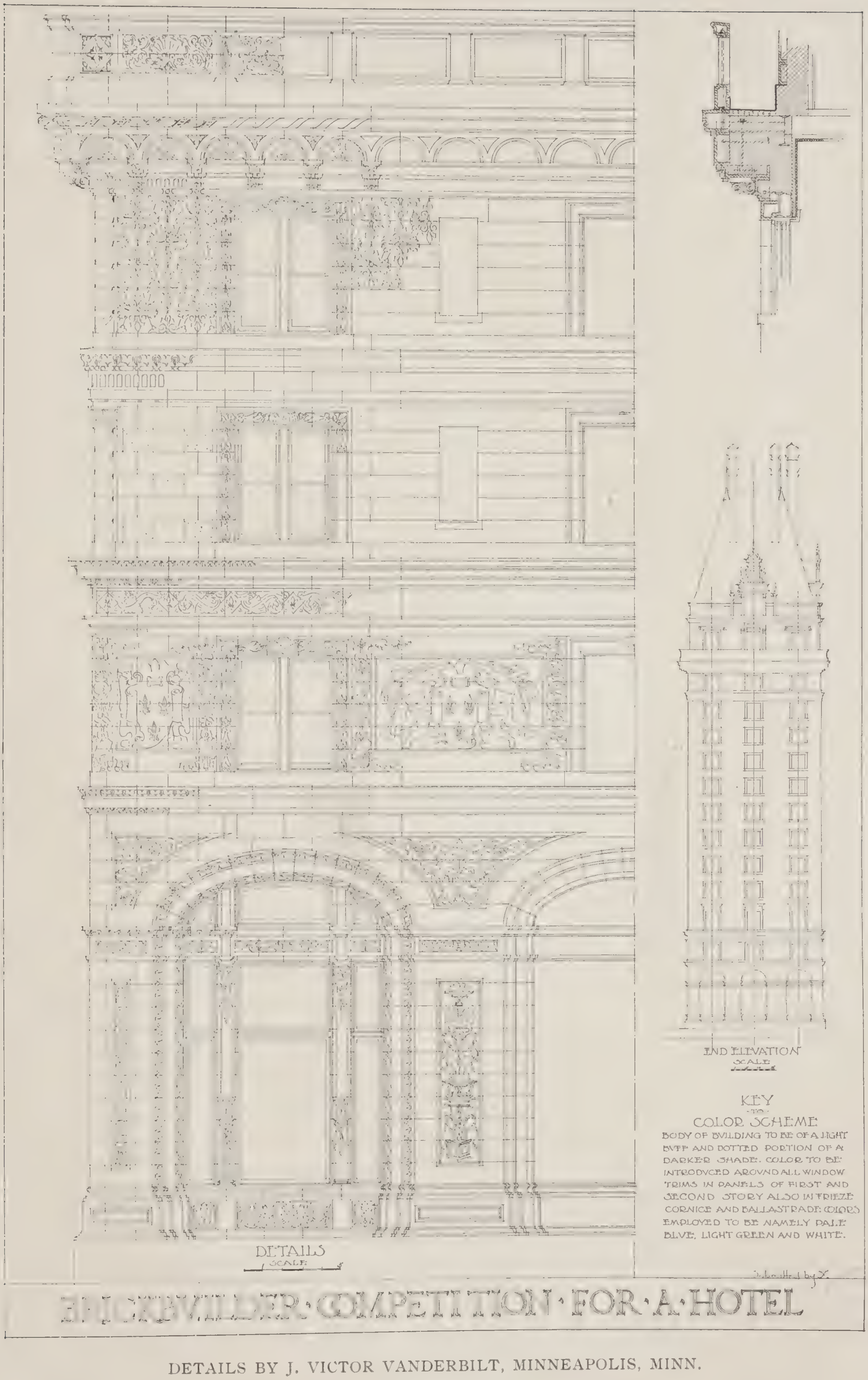


DETAILS BY FREDERICK J. LARSON, BOSTON, MASS.

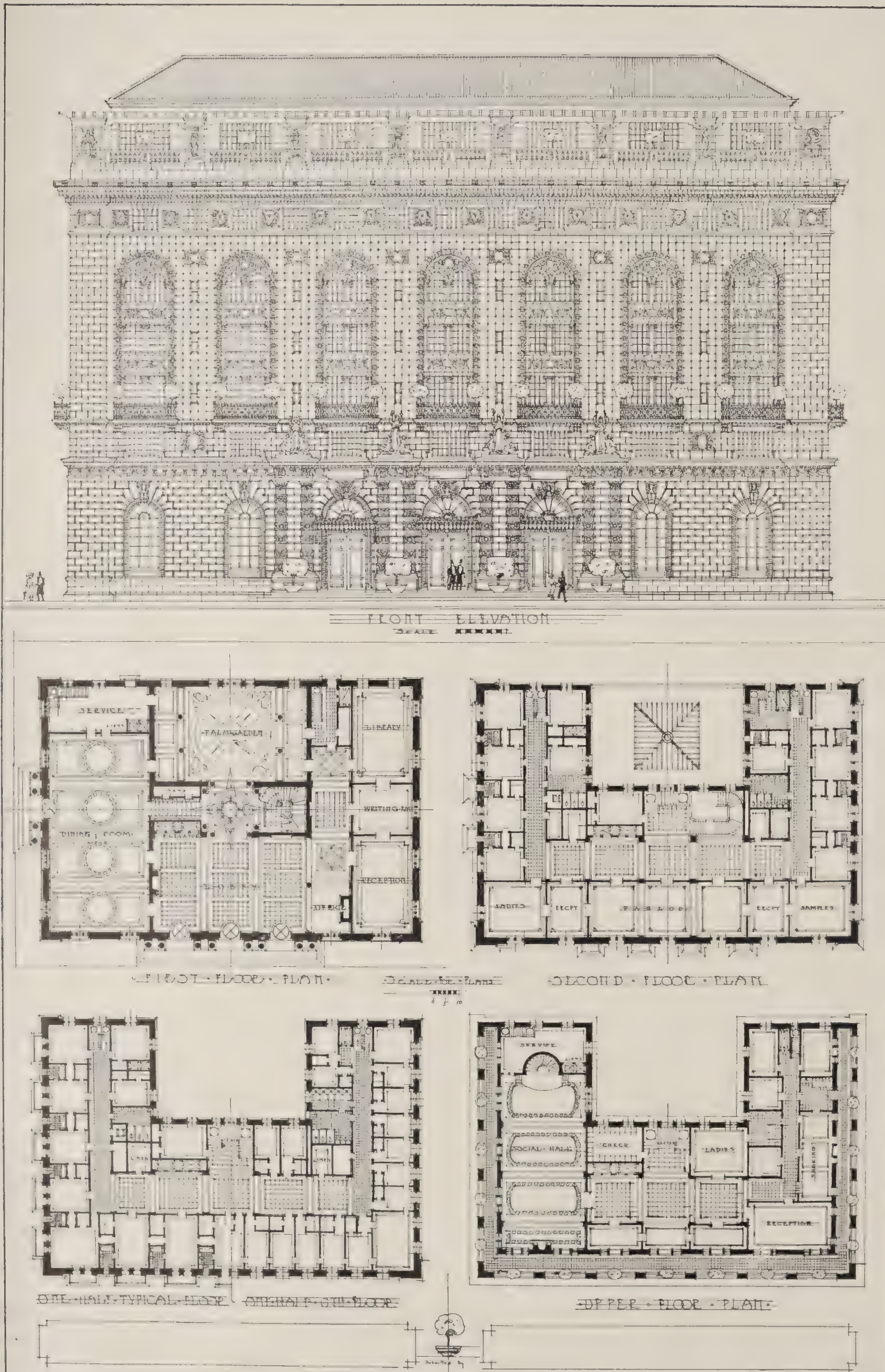


FIRST MENTION

Submitted by J. Victor Vanderbilt, Minneapolis, Minn.

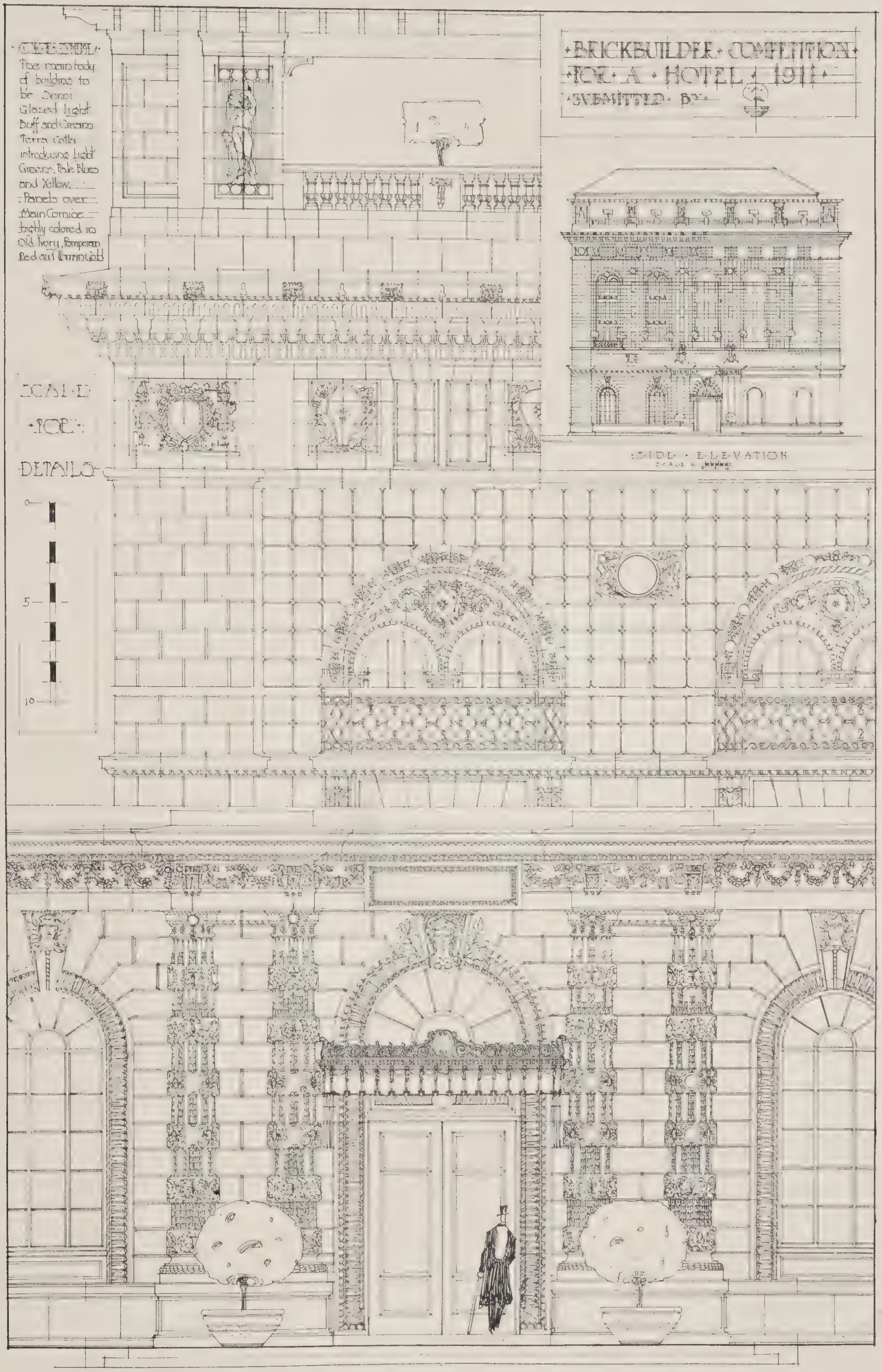


DETAILS BY J. VICTOR VANDERBILT, MINNEAPOLIS, MINN.

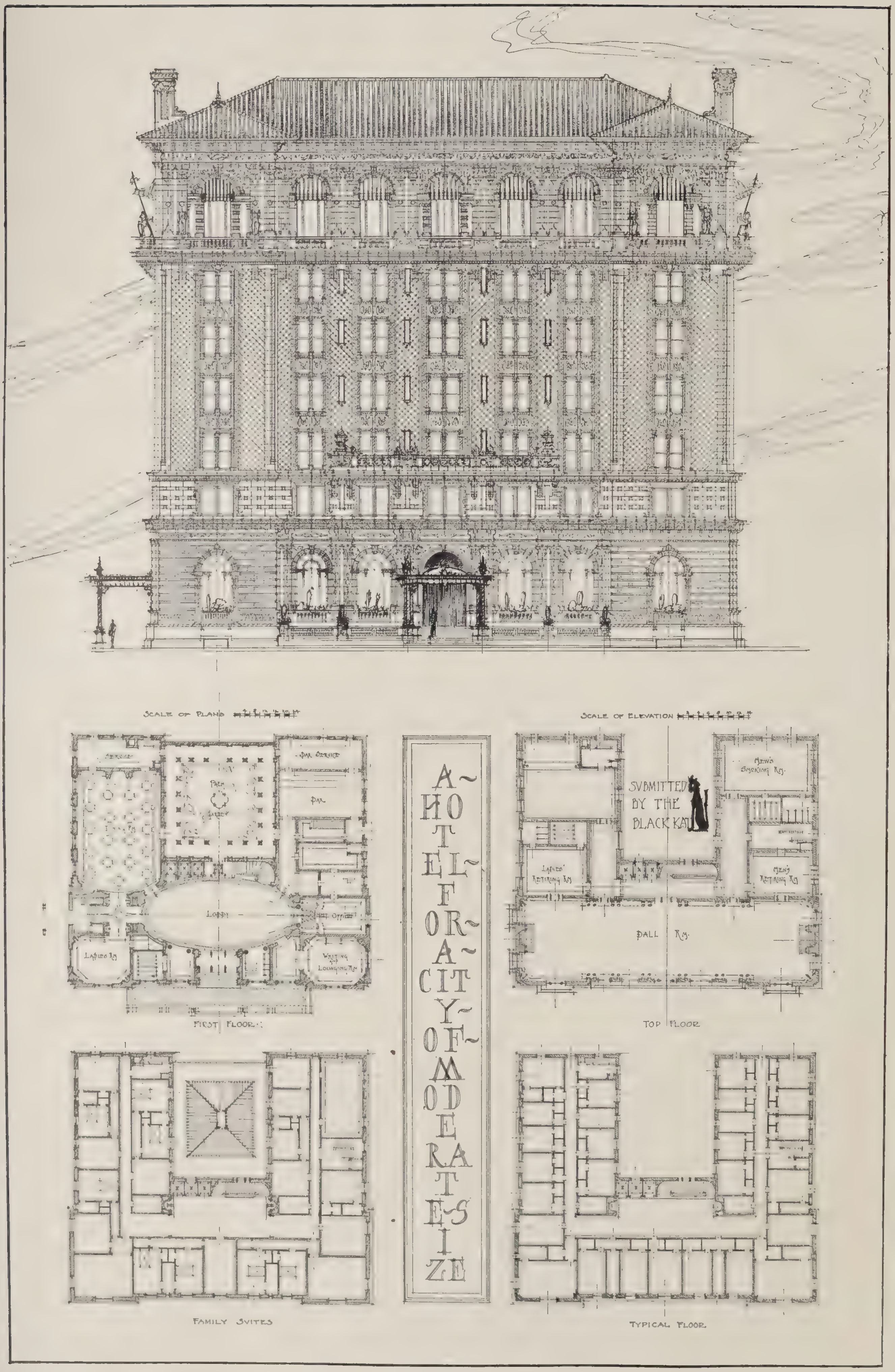


SECOND MENTION

Submitted by Walter Watson Cook, Boston, Mass.

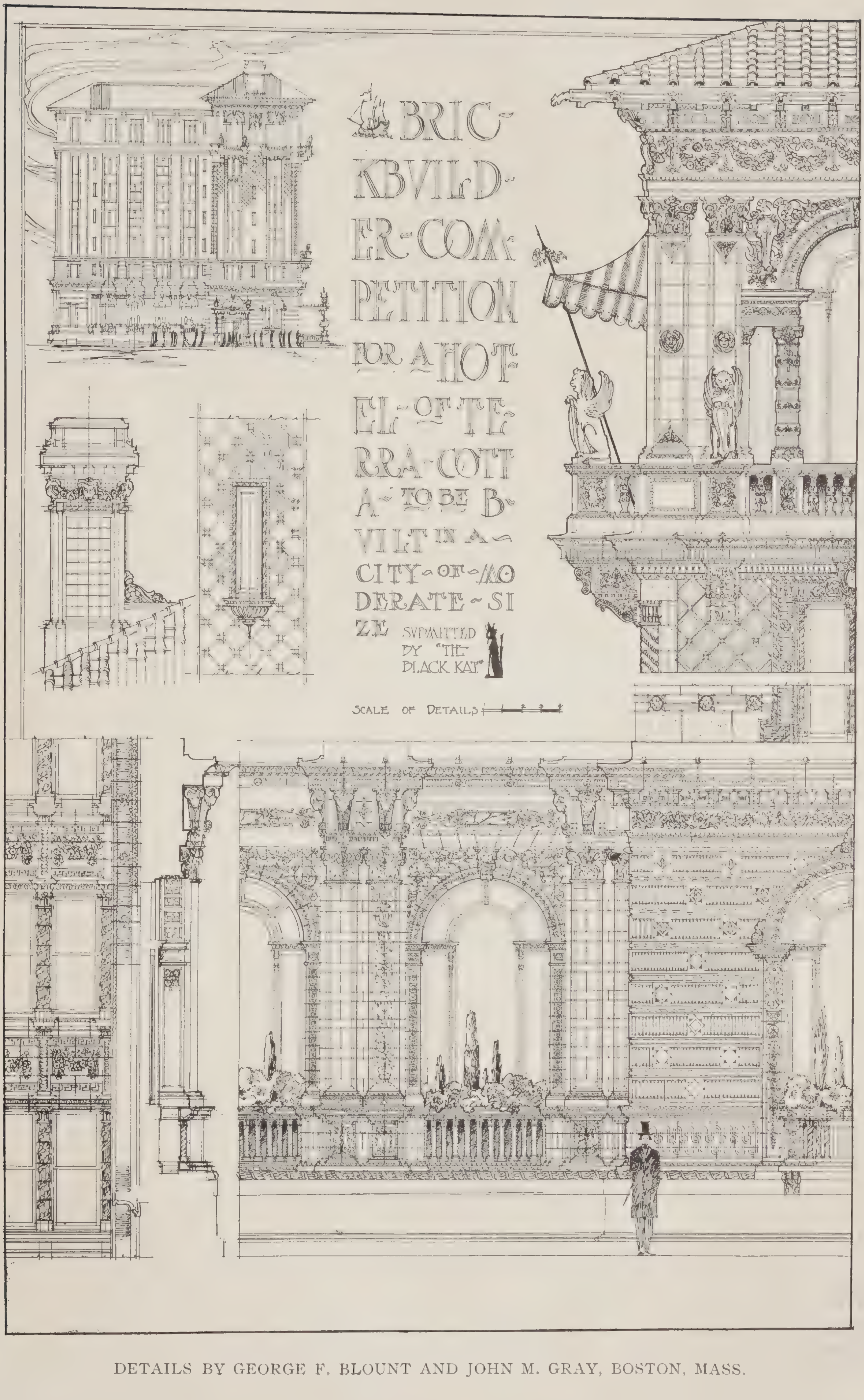


DETAILS BY WALTER WATSON COOK, BOSTON, MASS.

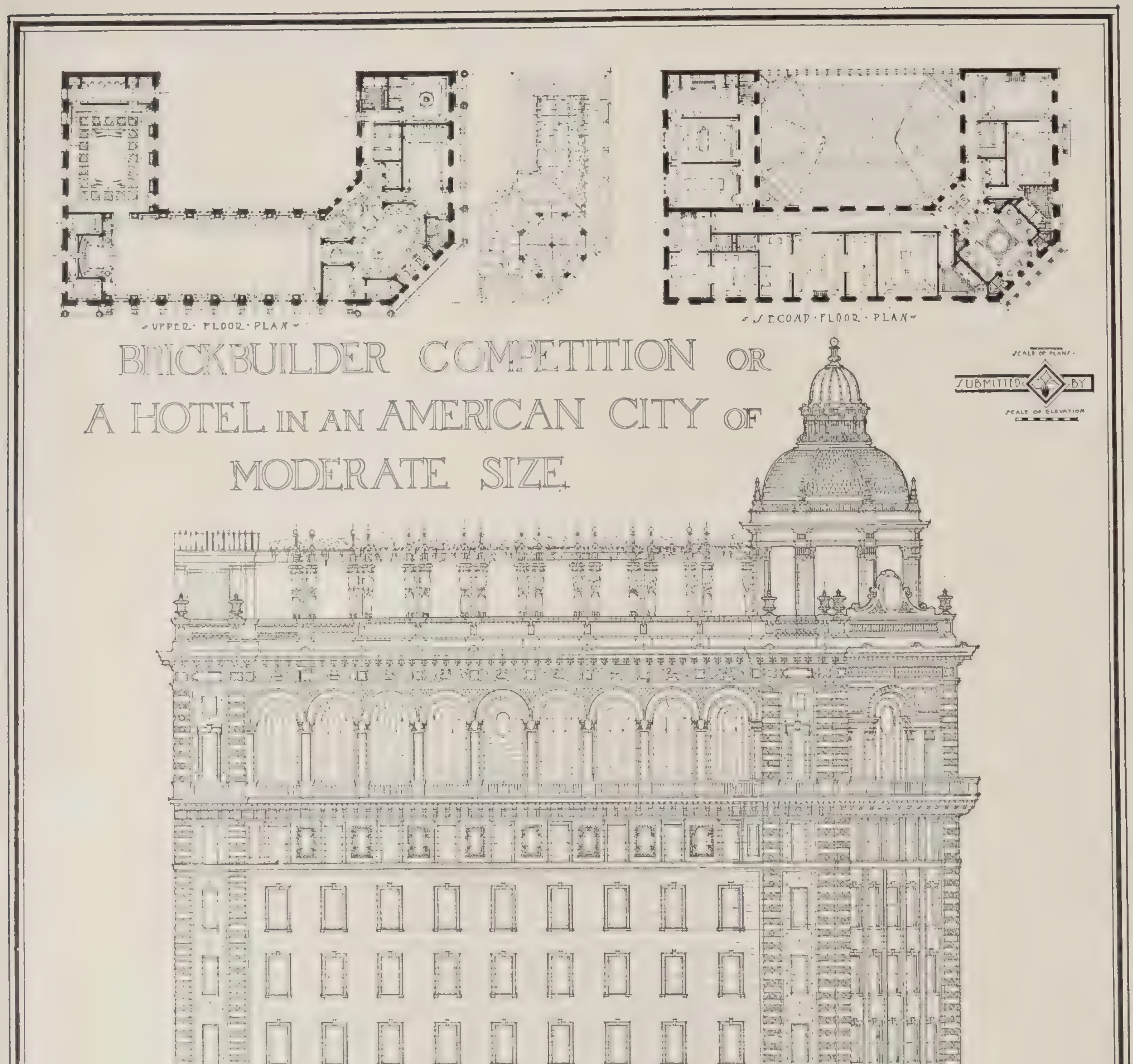


THIRD MENTION

Submitted by George F. Blount and John M. Gray, Boston, Mass.

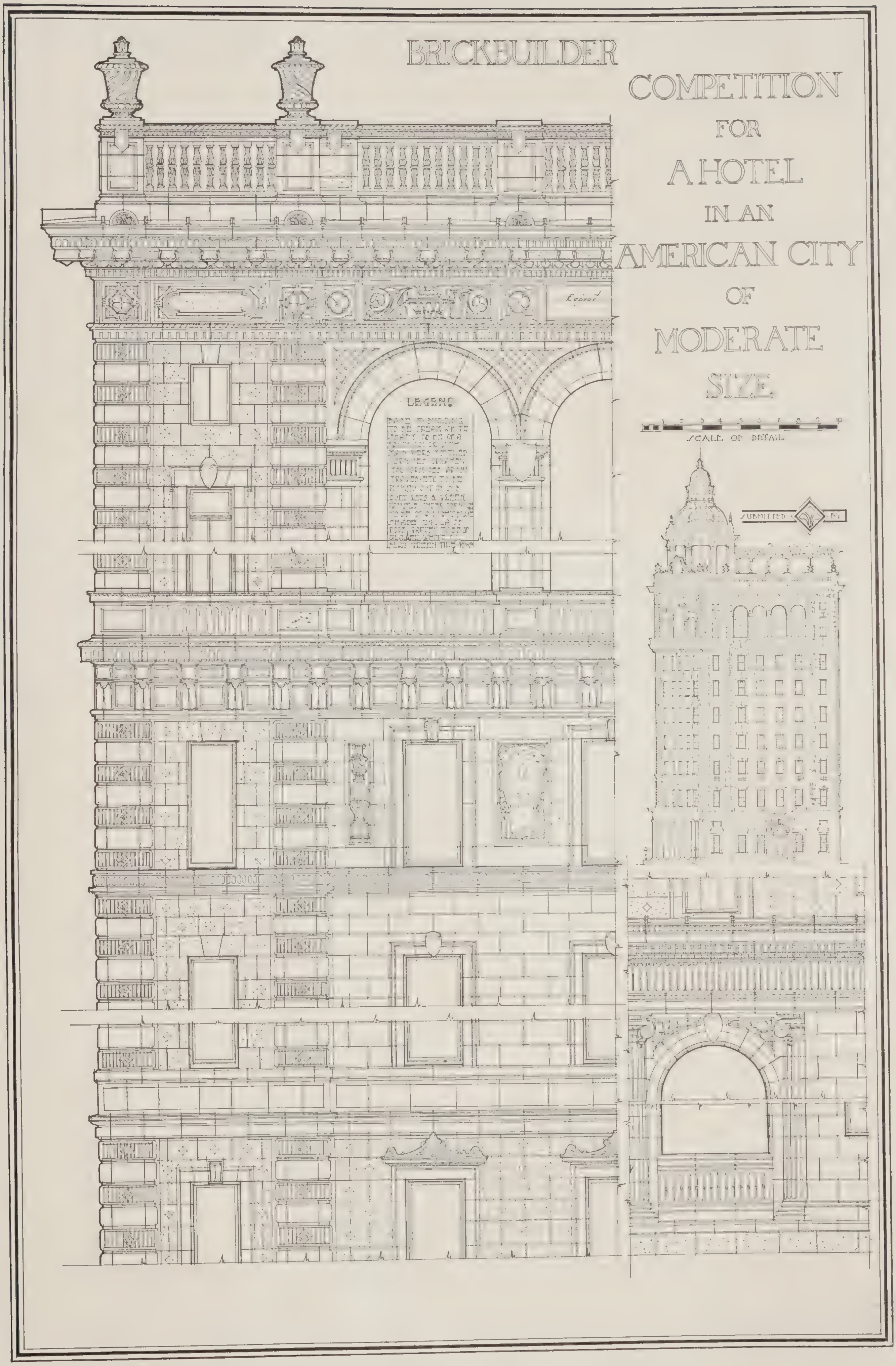


DETAILS BY GEORGE F. BLOUNT AND JOHN M. GRAY, BOSTON, MASS.

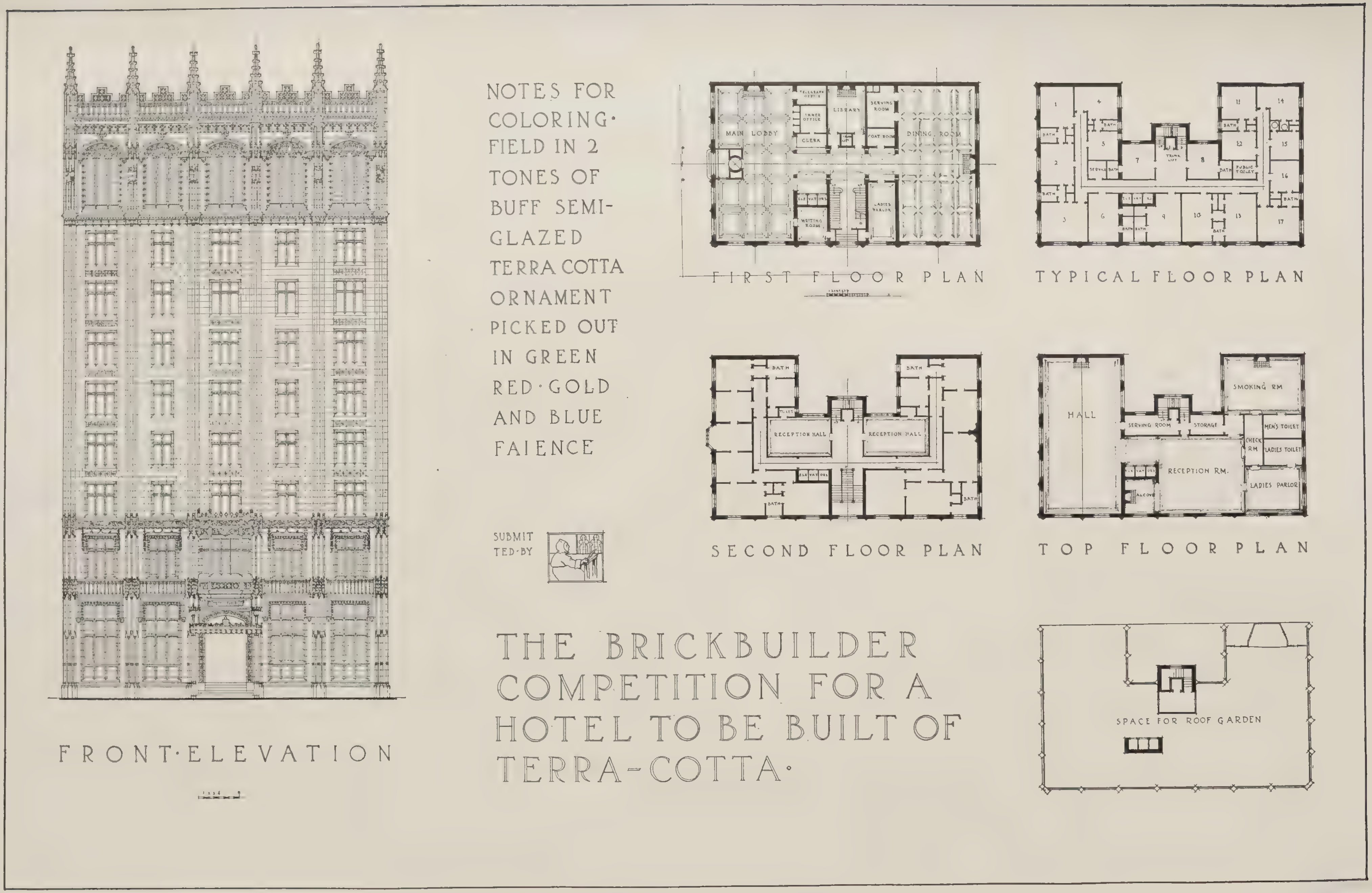


FOURTH MENTION.

Submitted by Albert M. Kirschbaum and Joseph J. Gander, New York City.

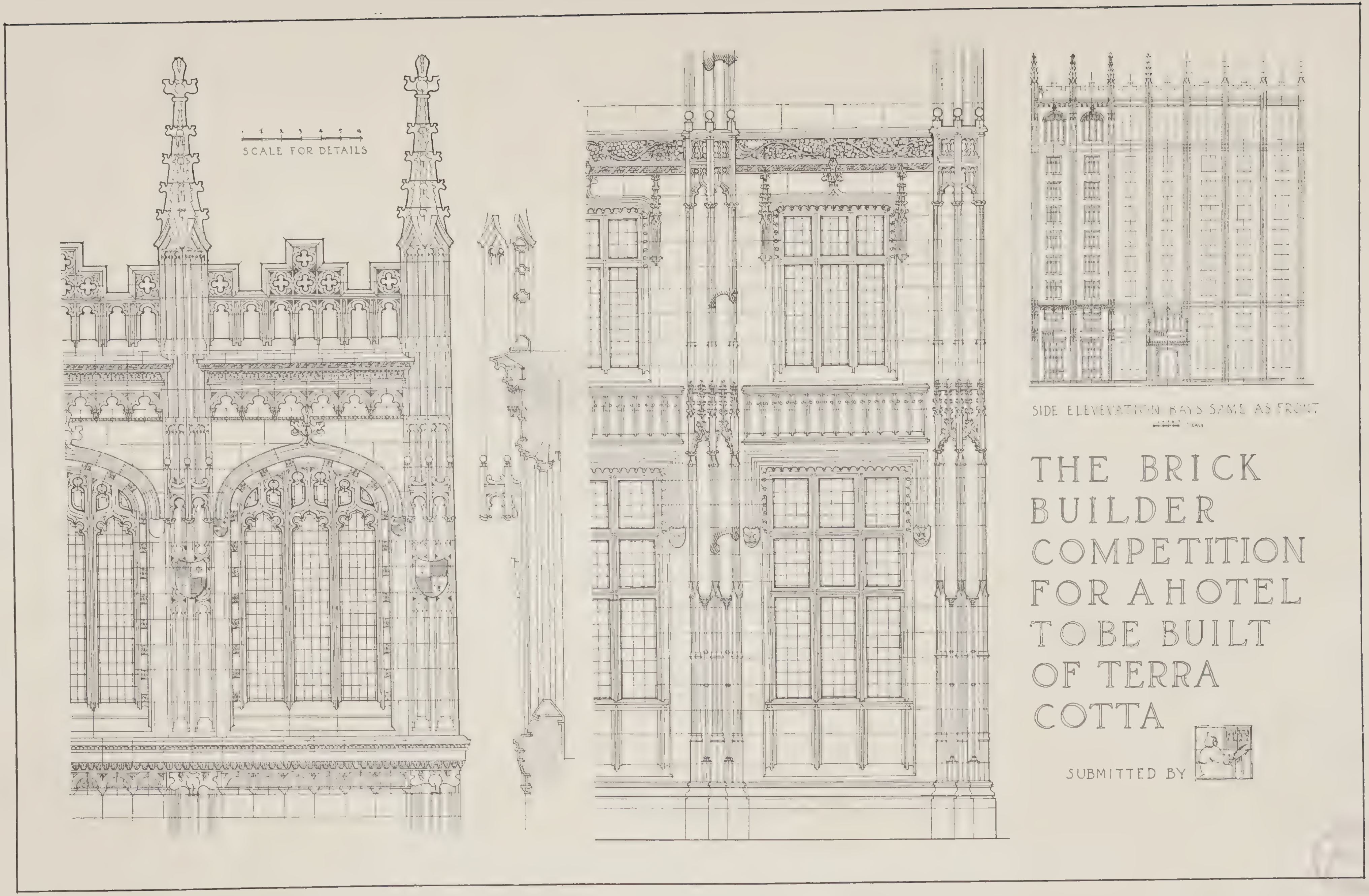


DETAILS BY ALBERT M. KIRSCHBAUM AND JOSEPH J. GANDER, NEW YORK CITY.

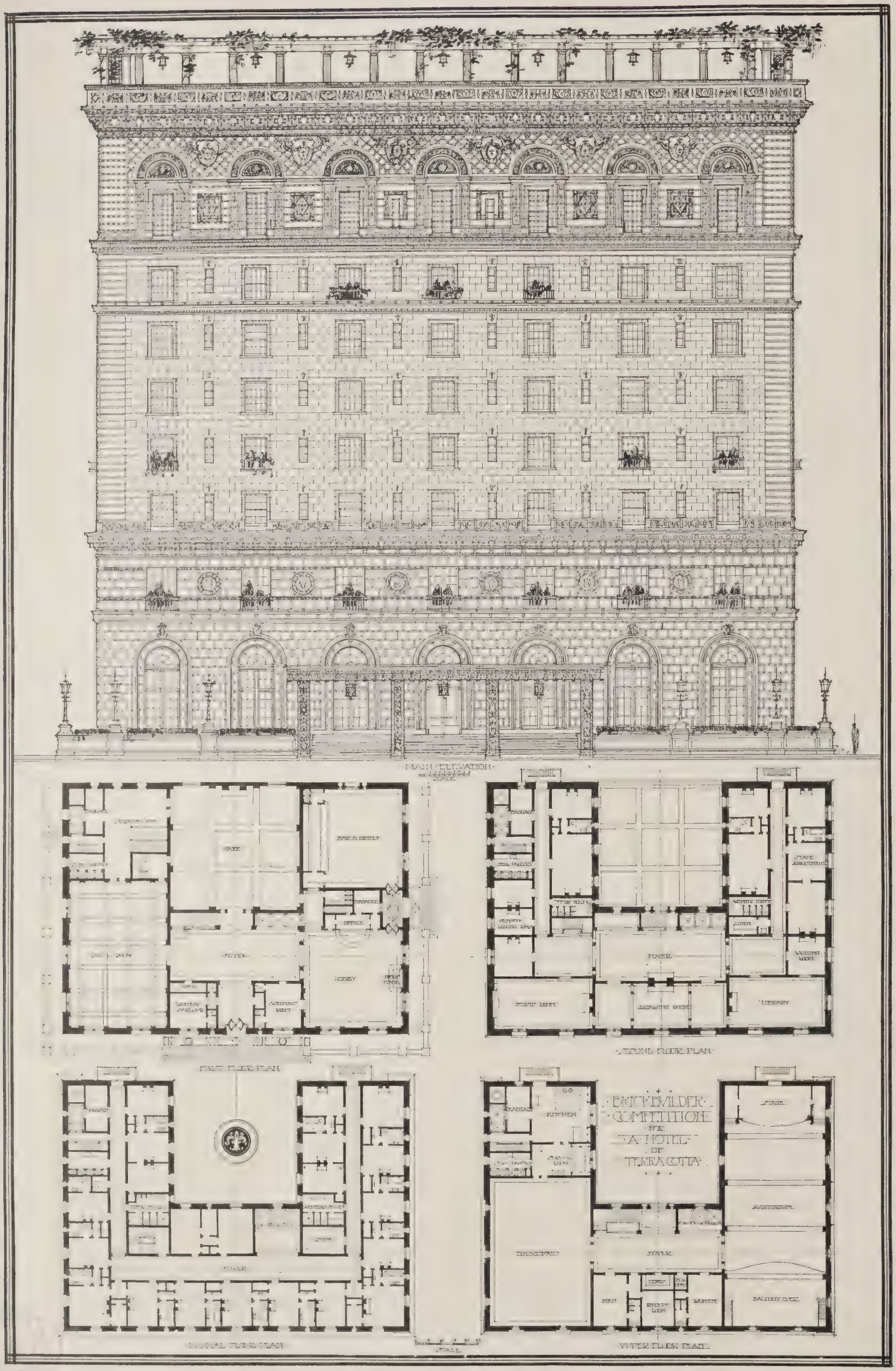


FIFTH MENTION.

Submitted by William Adams and Charles Cleary, Boston, Mass.

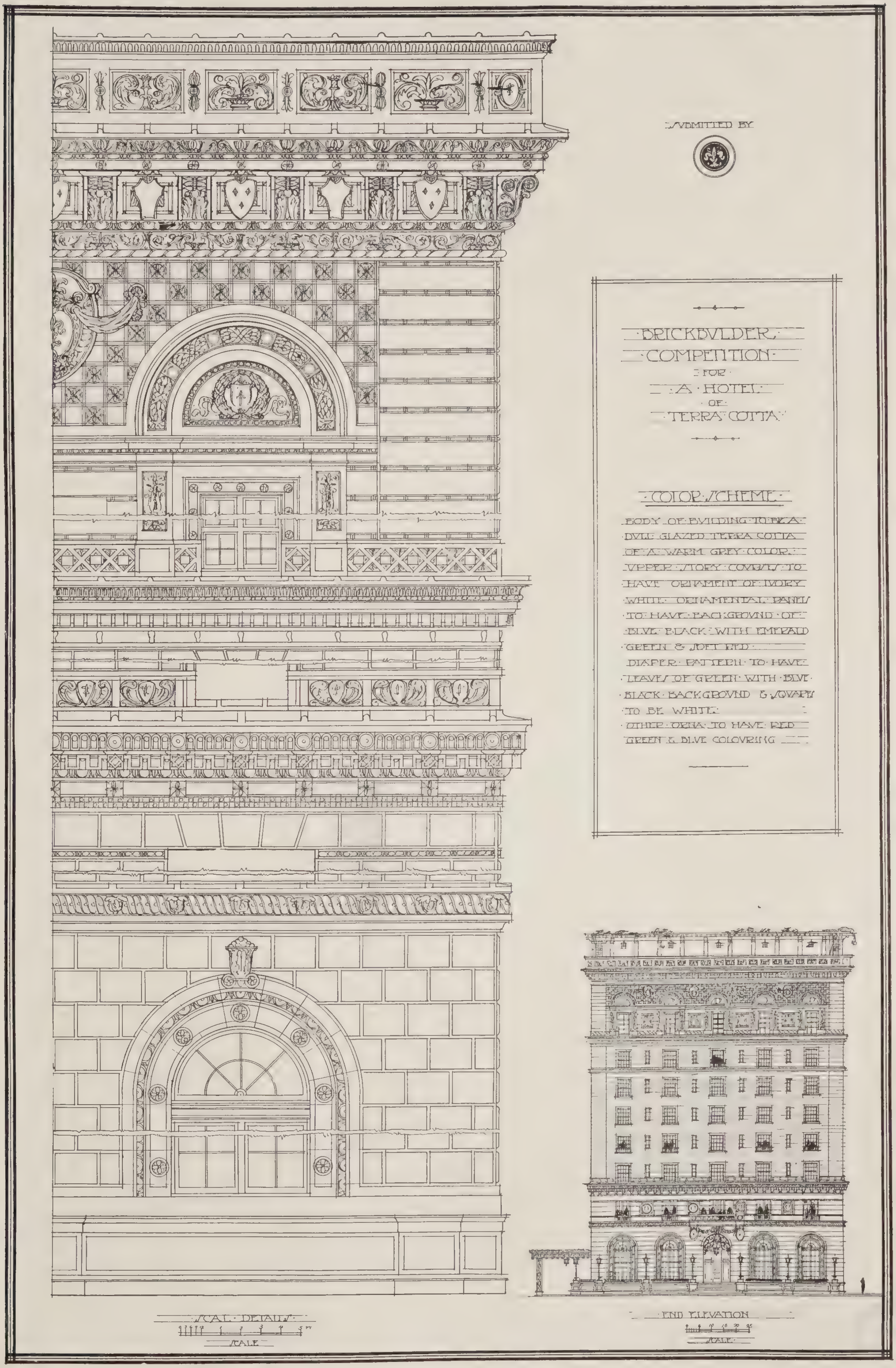


DETAILS BY WILLIAM ADAMS AND CHARLES CLEARY, BOSTON, MASS.

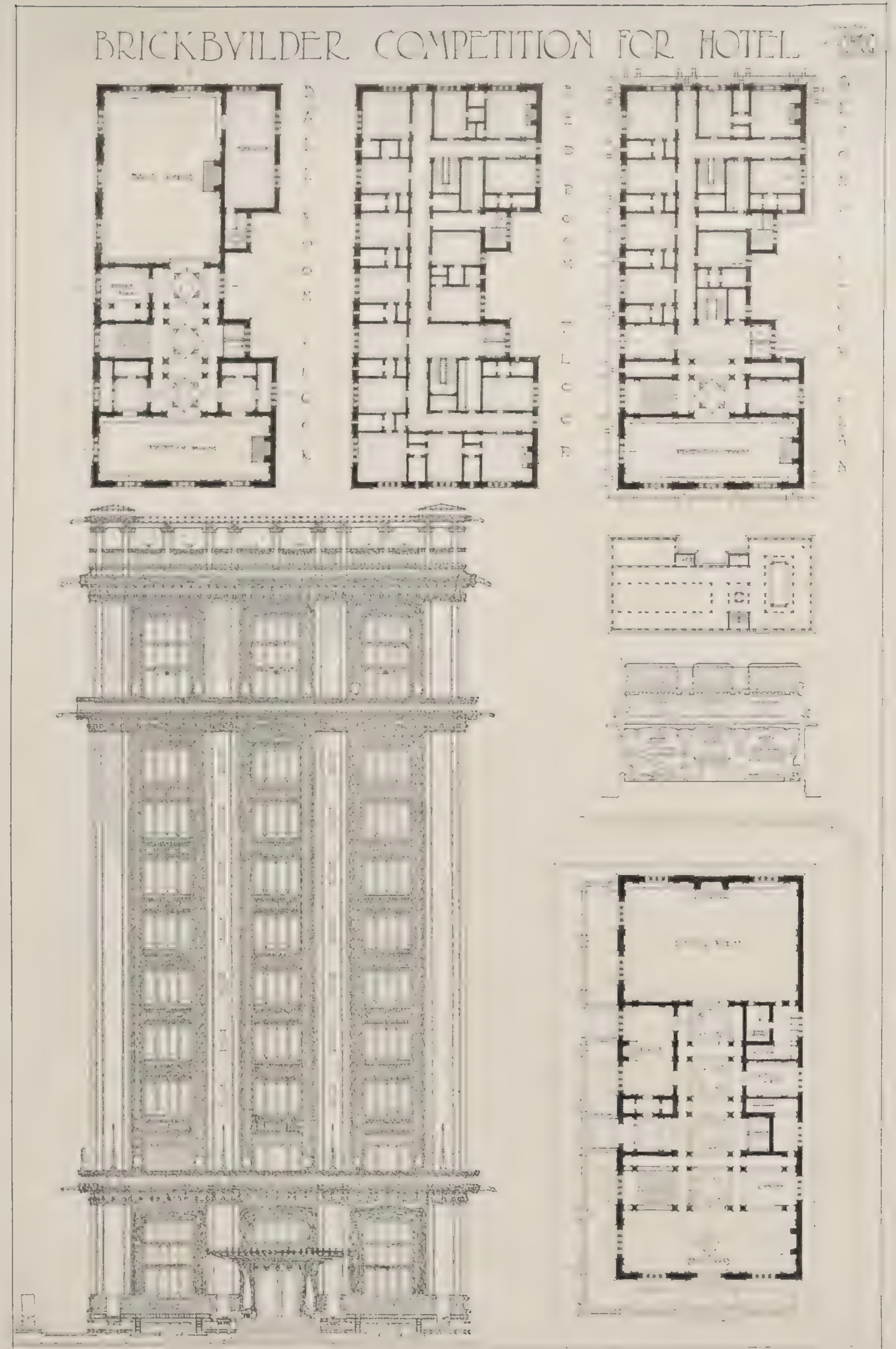


SIXTH MENTION.

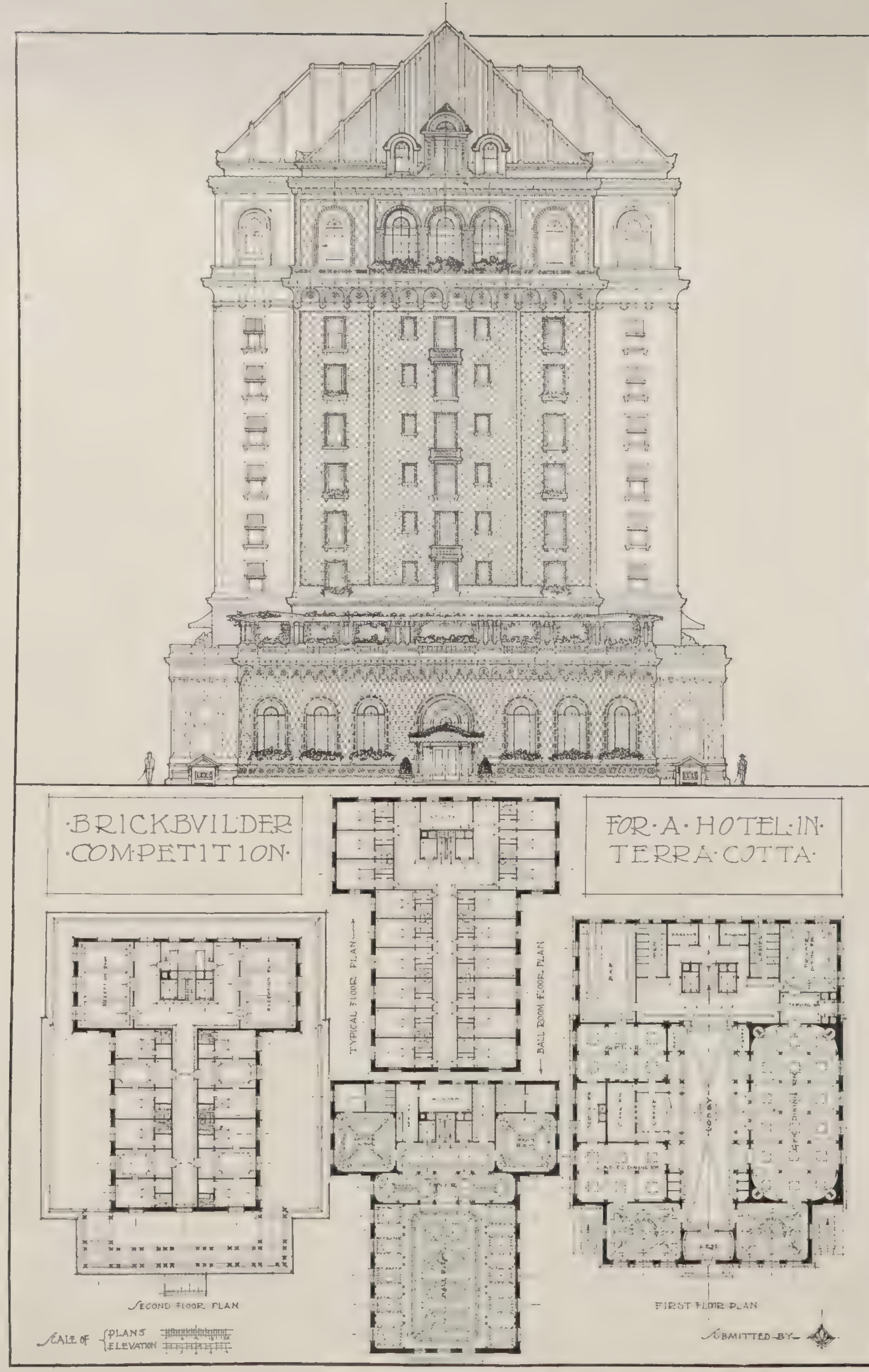
Submitted by William R. Schmitt, New York City.



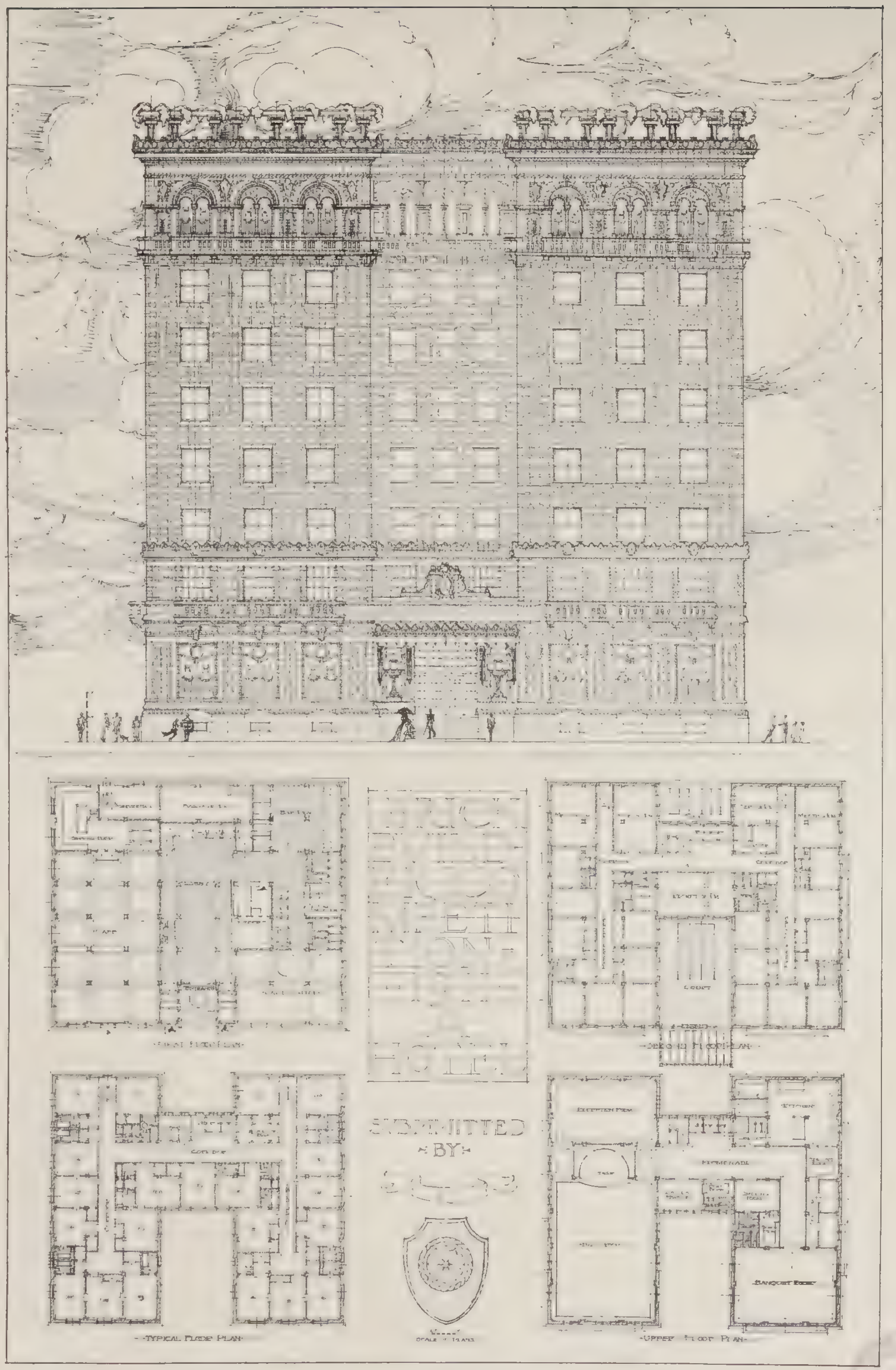
DETAILS BY WILLIAM R. SCHMITT, NEW YORK CITY.



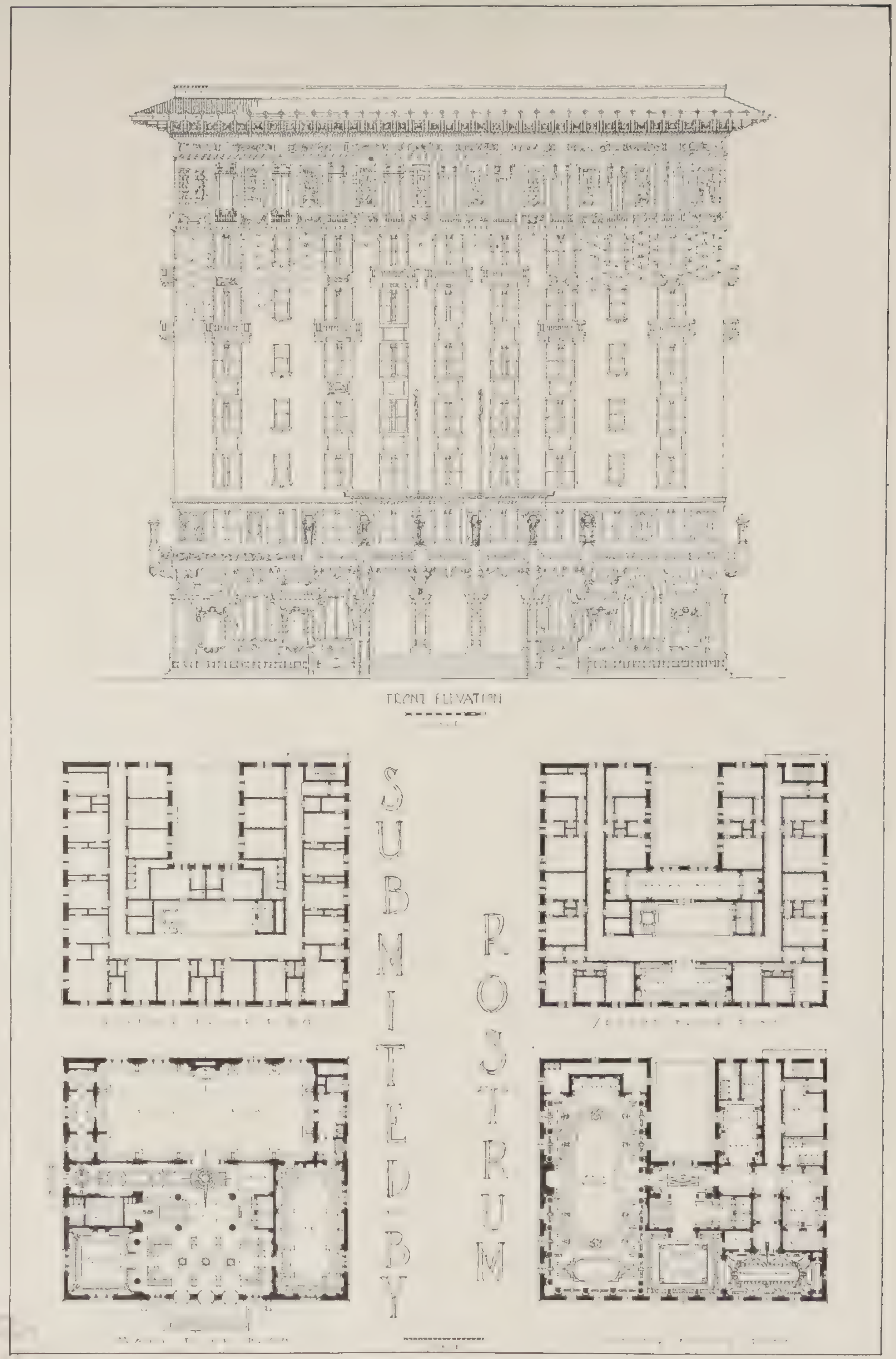
SUBMITTED BY RALPH H. HANNAFORD, ROXBURY, MASS.



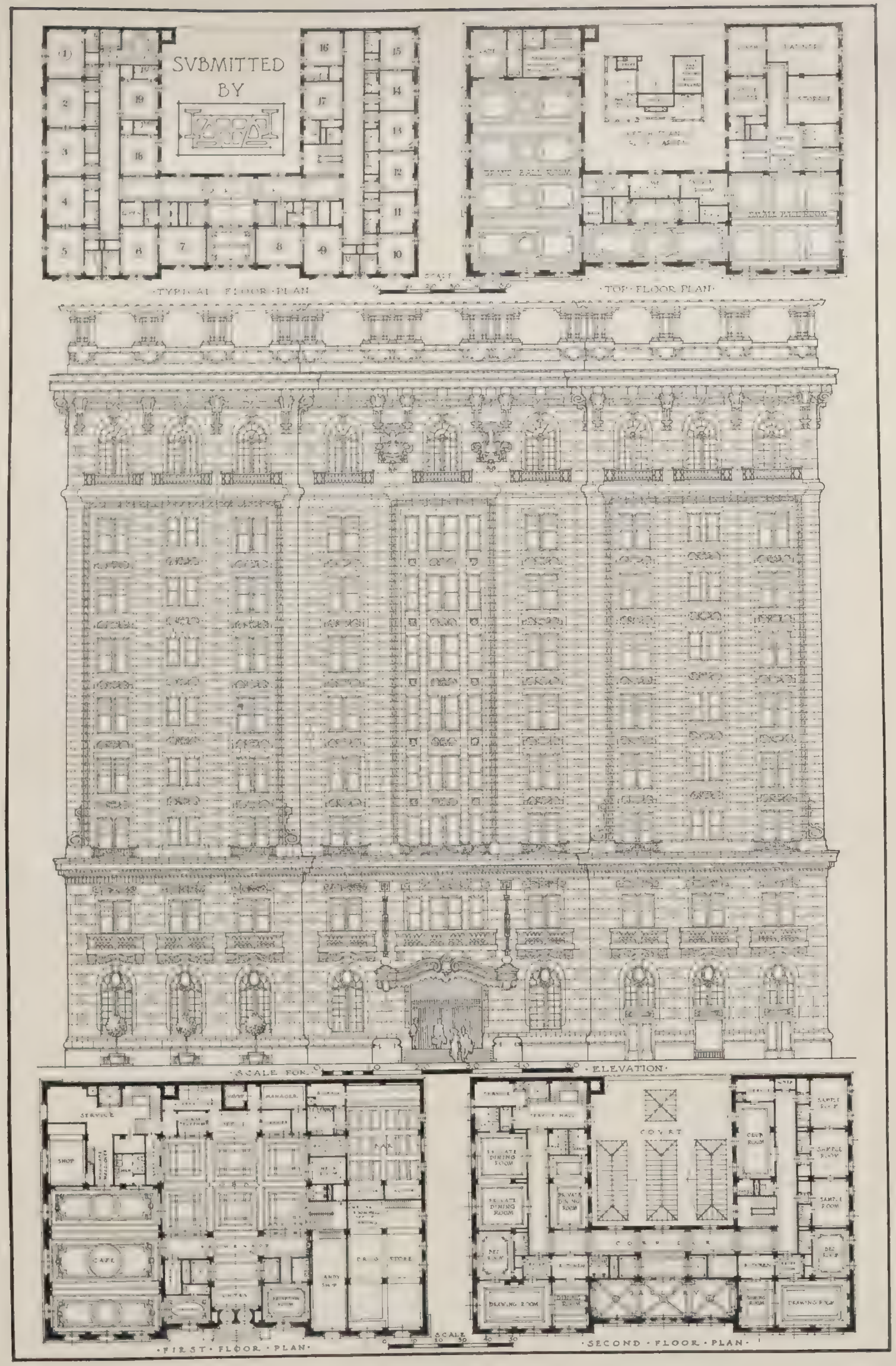
SUBMITTED BY FRANK J. SAUM AND THOMAS P. SAUM, NEW YORK CITY.



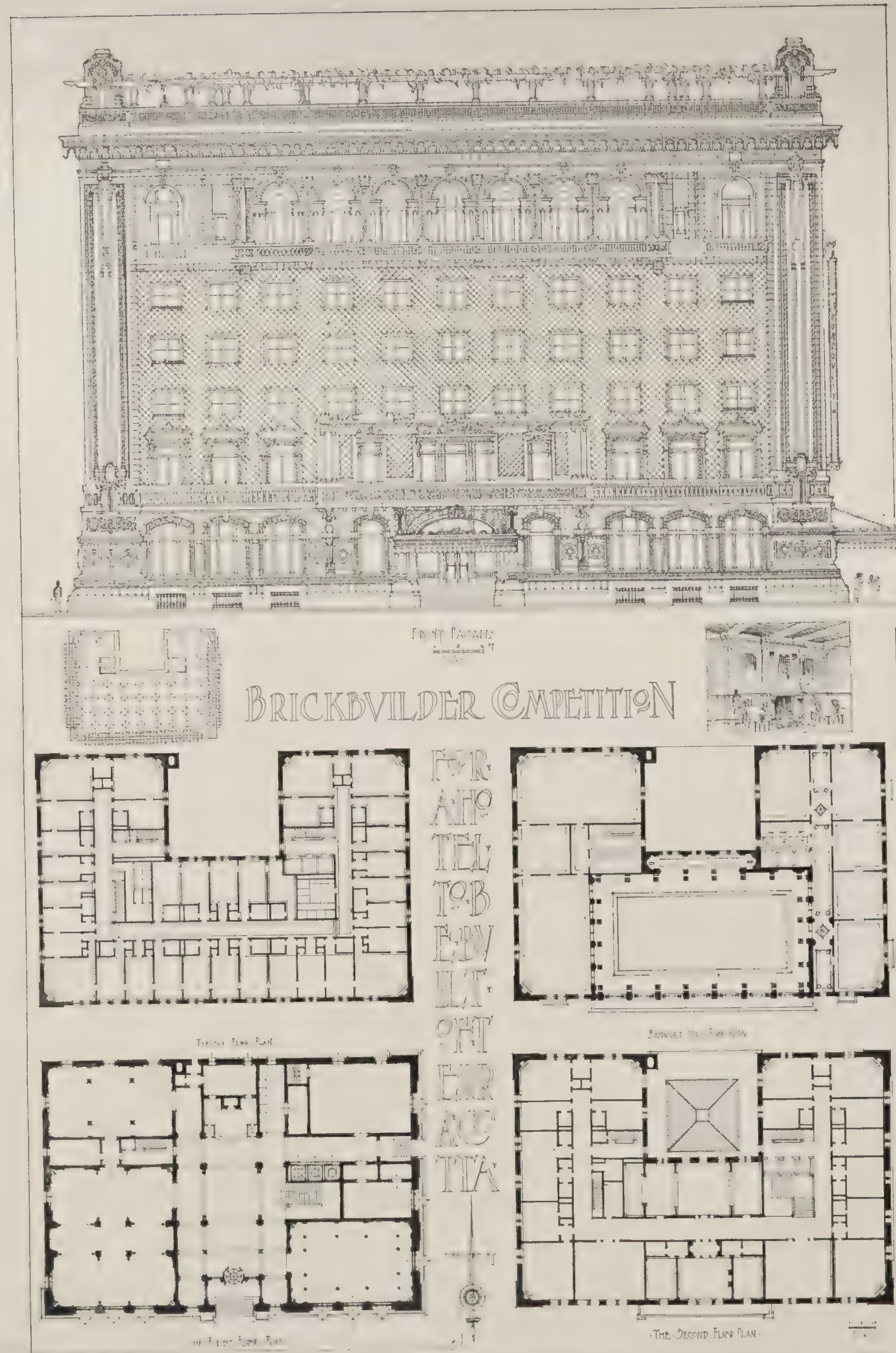
SUBMITTED BY WALTER J. MATSON, SAN FRANCISCO, CAL.



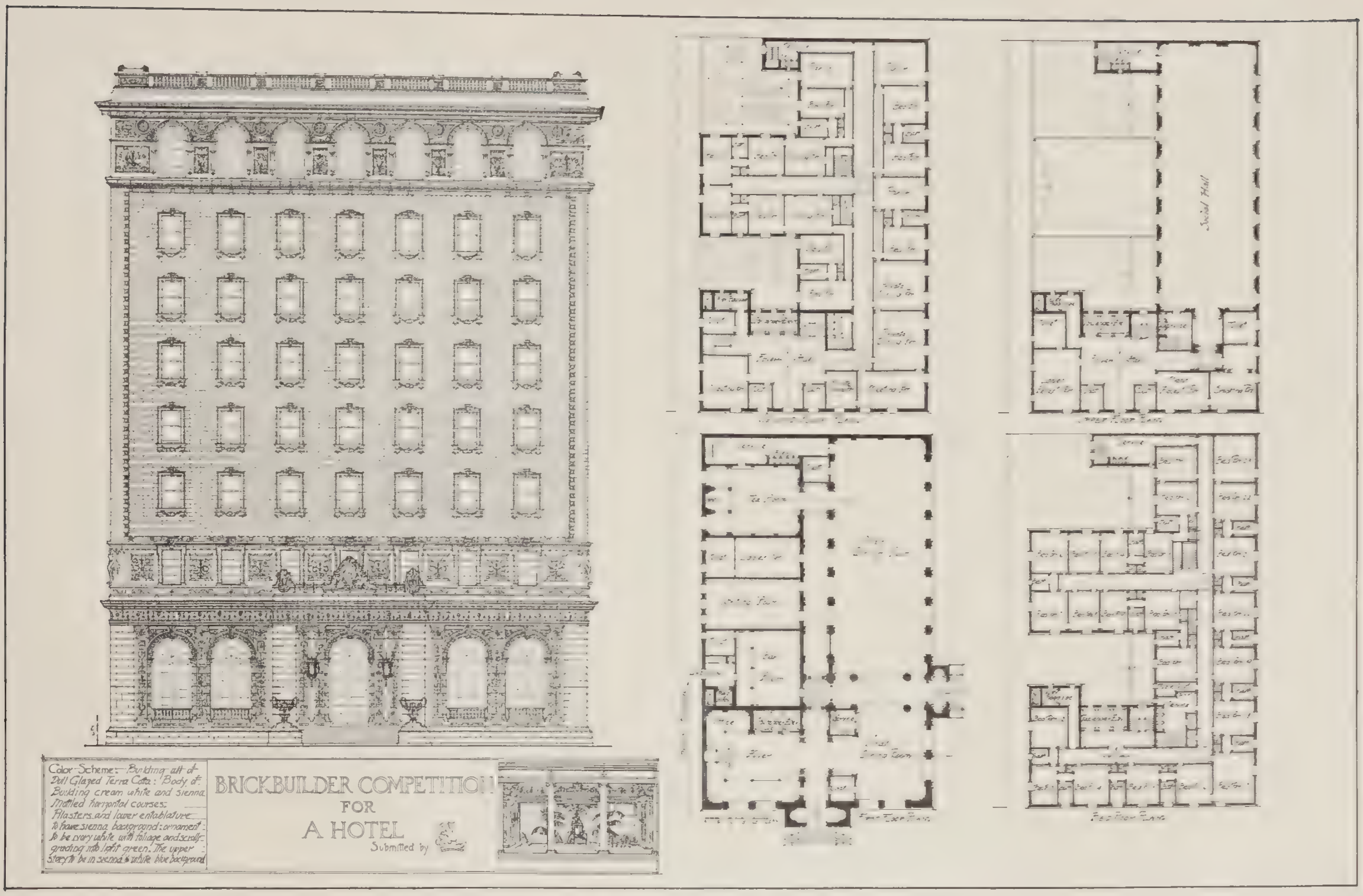
SUBMITTED BY JOHN T. BRUGGER AND CHARLES F. SCHAEF, PHILA., PA.



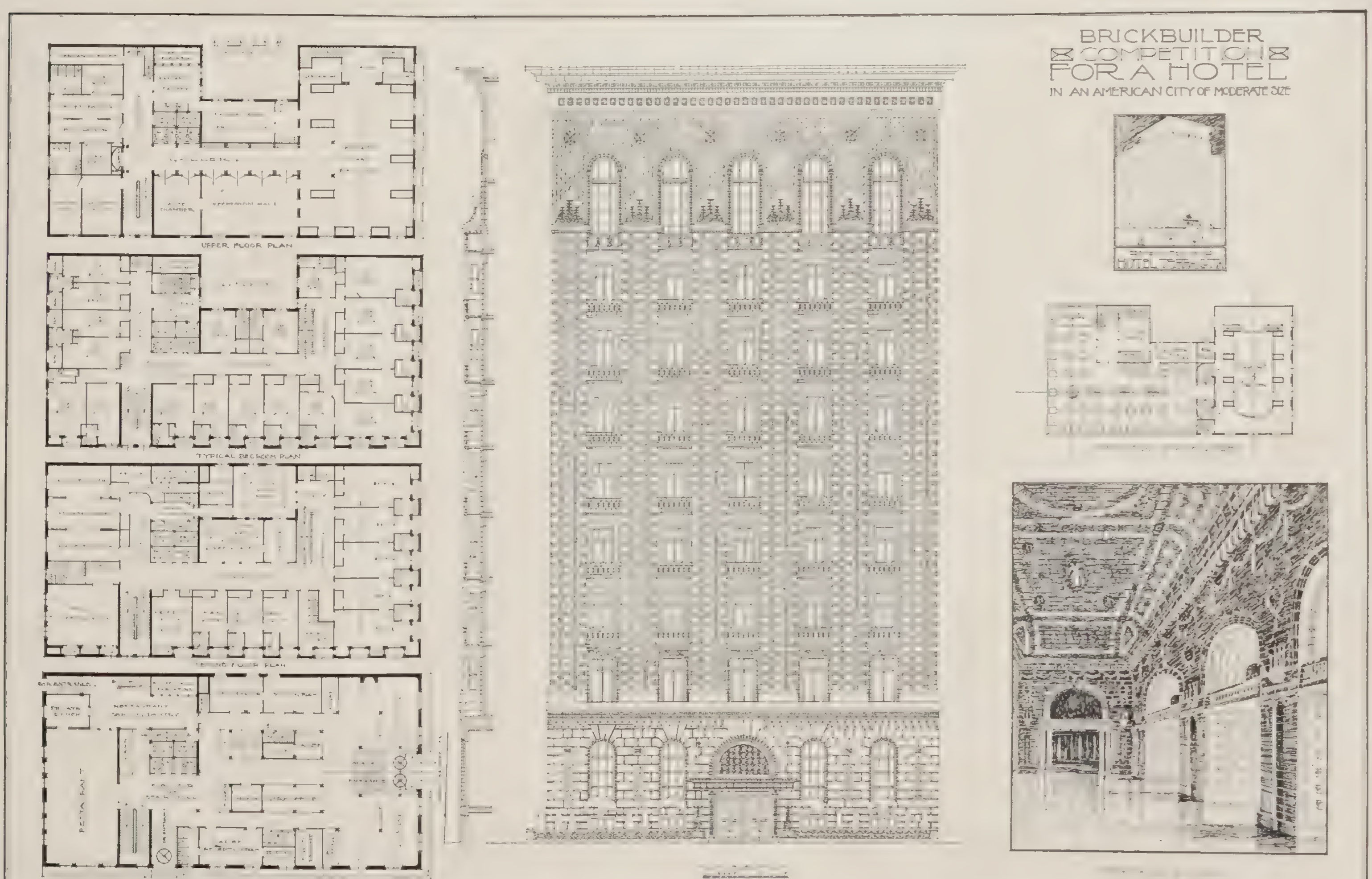
SUBMITTED BY DANIEL F. McLAUGHLIN, LOUISVILLE, KY.



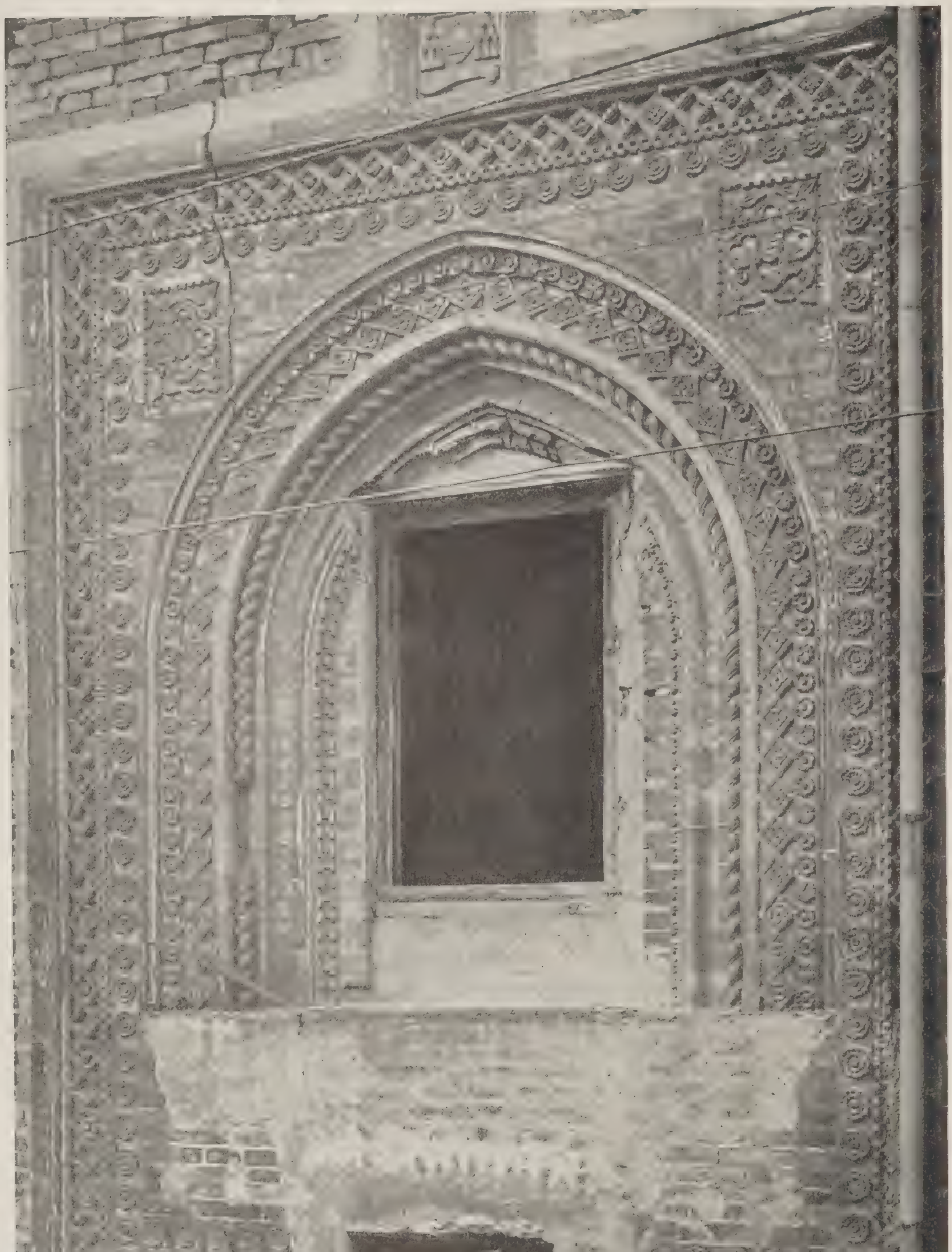
SUBMITTED BY MAURICE P. MEADE, BOSTON, MASS.



SUBMITTED BY J. W. SCHMIDT, NEW YORK CITY.



SUBMITTED BY WILL. BERNHARD, BROOKLINE, MASS.



Window in Terra Cotta, 15th Century, Palazzo Della Porta, Novara, Italy.

Architectural Terra Cotta

Its Physical and Structural Properties

By EDWARD H. PUTNAM

TO UNDERSTAND the various properties of Architectural Terra Cotta some idea of its physical composition and the method of manufacture is necessary. There are so many different elements that enter into its proper treatment at the factory end that the subject can be treated in a rather superficial way, only, in an article of this kind.

Physical Composition. Primarily terra cotta is a burnt clay product, but nothing could be further from the truth than the general misconception that it is similar to brick. Terra cotta is a mixture of anywhere from two to six different kinds of clays, each with certain properties of its own, added for a certain reason. To the mixture is added an amount of grit, or terra cotta previously burned and ground for this purpose. The clays are carefully selected with regard to their burnt properties, what the shrinkage is, state of vitrification, porosity and color. Then they must be carefully considered and tested in their relation to each other; there must be clays that bind the component parts firmly together, and which — supplemented by the grit — prevent warping and too great a shrinkage during the process of drying and burning. The clay body must mature at the temperature determined by the point at which the glaze matures, and the coefficients of contraction and expansion between the body and the covering slip or glaze must be adjusted to avoid crazing in the glaze. Ordinarily the temperature approximates 2300° Fahrenheit. The shrinkage of the body at this heat is one inch to the foot, and is more constant than would generally be supposed. The inevitable slight variations are taken care of in a way to be explained later.

The component parts are thoroughly mixed by machinery with enough water to make the resulting body plastic, so that it may be easily worked.

METHOD OF MANUFACTURE

Drawing. In the manufacture of terra cotta the first thing the manufacturer does is to completely redraw the architect's plans to "terra cotta construction." It is impossible that the architect should do this himself beyond a certain extent, for it requires years of practical experience in the manufacture of terra cotta, knowledge of the manufacturing methods of the factory in which the material is to be made, and intimate knowledge of the characteristics of that factory's product, as well as thorough experience in construction and draughting. For instance, all factories do not use the same shrinkage scale, and in some factories more than one shrinkage scale is used because different colors may require different temperatures, involving a different shrinkage. There are countless other points which must be considered. The shape of the piece, the relation between its dimensions, and the end upon which it is to be set in the kiln, must be thought out carefully, so that it will be certain to burn straight and shrink evenly.

Terra cotta cannot be set on its face for the slip or glaze fluxes in burning and adheres firmly to anything with which it comes in contact. The glazed material requires particular care in this respect.

The method of anchoring to the form of frame construction the architect elects must be

worked out in detail, and here again intimate knowledge of terra cotta is necessary. The drawings show the size of every anchor, its attachment to the piece with the necessary apertures, and the attachment to the frame. Complete iron schedules are compiled for the iron contractor's bid. The dimensions of the bond are given and its connection with the masonry or iron work. All joints are clearly shown, and they differ from stone joints in that possible uneven shrinkage must be taken into account with regard to correcting it after burning. The better class of manufacturers always figure entrance and lower story work, where the joints will be prominent, larger than the actual size necessary to permit grinding the joints by machinery to mechanical exactness.

The scale drawings are sent to the architect for approval, and on return full size drawings are made to shrinkage scale for the use of the modelers and moulders.

Models and Moulds. When the terra cotta calls for ornament or figure design, the model is made in clay by hand. Sometimes the architect indicates roughly the style of ornament desired, and leaves it to the manufacturer to develop the design in detail. For this reason the manufacturer must maintain the highest quality of skilled labor in the modeling department; frequently the head of the department is a true sculptor in an original way, and he must be conversant with every style of architectural ornament as well. The mechanical models are made in plaster. A fully equipped photographic department, which the manufacturer must also maintain, prepares photographs of the models, which the architect approves or revises unless he prefers to inspect the work personally. Even in a completed state the models are subject to his revision. When approval has been received plaster moulds are made directly from the models, one for every piece of different design; and to expedite the work, or when an unusually large number of exactly similar pieces are required, two or more moulds are made. It will be readily seen that great economy in modeling results when a design is so arranged that the ornament frequently repeats.

Pressing. In the moulds the terra cotta is pressed by hand. It has proved impossible to use machinery satisfactorily for even the simplest class of work. The pressing does not require especially skilled labor, but every piece must also be finished by hand with modeling tools. In the case of intricate ornament it frequently takes as long to finish the piece as it does to press it, and the finisher must possess some knowledge of the essentials of modeling.

Drying. Before the piece can be colored and burned, it must be thoroughly dried. This is necessarily a slow process at first. Fully one half of the entire shrinkage takes place during drying, and unless this goes on gradually warping is inevitable, and warping started in drying almost invariably becomes more marked in burning. There is also danger of cracking if the heat is applied too soon. However, it is possible to heat the buildings at night above the normal temperature, and drying is further expedited by placing the material in artificially heated tunnels when the process is far enough advanced. The time required to dry a piece of average size is one week. In case of an unusually large piece with dimensions out of proper ratio the time must be doubled.

Spraying. When the building is of one color the application is a comparatively simple matter. The slip in liquid form is sprayed on with an atomizer operated by compressed air. In the very simplest colors from two to three coats of one slip are sufficient. The number of slips required varies from one to four — and even five — in the more complex glazes.

In coloring polychrome material the method of application is the same, in general, except that it is a much more delicate operation and requires considerable skill on the part of the operator.

In the preparation of the various colors the highest kind of technical ceramic chemistry is required. There are no glazes on the market that are suitable for terra cotta and every factory

must maintain its own ceramic chemical laboratory. The men at the head of these have in general obtained degrees from one of the best universities in the country that offer a ceramic chemical course, and in many instances have studied in Germany or England. At best, however, the theoretical knowledge obtained in this way serves only as a basis for experiments which must be adapted to local conditions, which not only are not alike in any two factories, but liable to change "without notice."

Burning. The kilns in which terra cotta is burned are made with a double wall through which the heat circulates, and the flames do not come into contact with the material. Such contact would be, of course, absolutely ruinous. Even a small leak admitting gas into the inner chamber is disastrous. The fuel in general use is soft coal. The size of an average kiln is 18 feet diameter and 15 feet high, inside dimensions, with a double wall from 3 to 5 feet through. Such a kiln will hold from 35 to 45 tons, burned weight. As the material is loaded, tiers are built of blocks and slabs of a fire-clay mixture, for terra cotta when it approaches maturity is too near the fluxing point to bear any great superimposed weight. The fire-clay body having been burned previously at a greater heat than that to which the terra cotta is subjected, is unaffected. Terra cotta reaches a temperature of about 2300° Fahrenheit, and at that heat is white-hot and translucent. It is this process that renders it so absolutely fireproof.

It takes from twelve to fourteen days to "turn over" a kiln: — one day to load; four days' slow heating, to evaporate any moisture the drying may not have eliminated; four days' full heat; four days' cooling, and one day to unload.

Fitting. Before shipment all work is laid out in sections and carefully fitted. The better class of manufacturers, by making the pieces too large originally, are able to discount any small inequalities of shrinkage by grinding the joints on a steel rubbing bed, with a mechanically accurate result. This, of course, involves an extra expense, generally confined to the manufacturer. It is slight, however, compared to the improvement in appearance. Grinding is hardly necessary for third story and higher work, where the distance from the ground makes any small irregularity unnoticeable.

Generally extra pieces have been made to take the place of any broken in kiln. If necessary replacements are rushed through and burned in a small kiln to save time.

Shipping. While terra cotta is a very strong material and when properly set in a building easily stands any compression it is called upon to bear, it is brittle and a sharp blow will chip it. Consequently, the greatest care is necessary when loading cars or barges. The material is packed in straw and firmly braced to prevent dislodgment.

PRACTICAL ASPECTS OF ARCHITECTURAL TERRA COTTA

Physical Limitations. The physical limitations of terra cotta have been indicated to some extent previously. Briefly, they are as follows: — The impossibility of economically making pieces of very great size; the slight variations in shrinkage to which the material is liable; and the impossibility of maintaining exact evenness of tone in some colors.

A piece exceeding 4 feet in any one dimension is very difficult to make. In the first place it is exceedingly hard to handle before burning, because the unburned body is very fragile. Secondly, it is hard to burn such a piece without undue shrinkage and a large piece is very liable to crack in the kiln.

The variations in shrinkage are largely taken care of to-day by rubbing or grinding the joints, as already described.

The slight variation of shade in some colors is due to variations of temperature in different parts of the kiln, and this cannot be absolutely regulated. In fact the variation is generally so

slight as to be immaterial; many architects insist upon it on the ground that it adds life to the color. It is never greater in degree than the variation which occurs in natural structural materials.

PHYSICAL ADVANTAGES. The chief physical advantages of terra cotta are that it is weatherproof, absolutely fireproof, and infinitely durable.

The terra cotta body is naturally porous but the slip with which it is covered either makes the exposed surface absolutely impervious or so slightly pervious that it is a matter of no moment, and consequently terra cotta is unaffected by the weather.

It is absolutely fireproof because it is burned at such a tremendous temperature during manufacture. Any heat it might experience in even a general conflagration could not affect it.

Samples of terra cotta which prove its durability have come down to us from very early times, at least from four thousand years ago, and are still in a fair state of preservation. The terra cotta of to-day is harder burned and closer knit than the early examples, and there is nothing in it that could decay. Every vestige of vegetable matter is eliminated by fire. The colors are also fixed by fire beyond the possibility of fading or wearing away.

COMPARATIVE COST. In general terra cotta may be said to average from twenty per cent to fifty per cent less expensive than stone, the difference depending largely on the design. The greater part of this saving is due to the economical methods of manufacture, and especially the possibility of pressing a great number of exactly similar pieces from one mould. This saving, of course, is particularly great in the case of ornament when every piece in stone would have to be separately carved. Ornament that is particularly intricate in design may cost in stone ten times its cost in architectural terra cotta.

These comparisons refer to terra cotta in one color, only. The polychrome material is more expensive, depending again upon the design, and upon the number and the character of the colors employed.

The comparative weight of terra cotta results in a saving in the cost of transportation, and the frame construction of the building may be made lighter for terra cotta than is usual for other materials.

Frequently when terra cotta is used, the insurance rates will be particularly low.

HANDLING AT JOB. The greatest care is taken in shipping terra cotta, and the greatest care should be taken in handling it at the other end. Here is a material carefully made by hand, perhaps rich with expensive modeling and executed in a number of colors, *and it is frequently thrown into a cart and actually dumped upon the ground as if it were common brick!* Consider the result! It is impossible that a great many pieces should not be broken beyond repair, and besides the cost of replacing these, there is the possibility of serious delay. Three weeks is the shortest possible time for replacing a piece of terra cotta under the most favorable circumstances.

Very great care should be exercised in the setting of terra cotta. Because it is a burnt clay material it is generally the brick masons who set it, and in mortaring the bed and end joints they smear the faces as if they were setting brick, perhaps ruining the effect of a whole course that has been carefully ground to mechanical exactness.

Good cement mortar should invariably be used. In exposed work, such as balustrades and copings, where the area of mortar jointing is large cement mortar *without lime* should be used exclusively. The entrance of water should be prevented even in climates where severe frost is a remote possibility. Care should be taken that the sand contains no more than a reasonable per cent of impurities that are inert as a binder.

DISCOUNTING DELAYS. In the first place, to prevent delays, ample time should be allowed the manufacturers in which to make the first shipment; *at least eight weeks* — preferably ten —

from the receipt of full information and approval of all working drawings. This allows time for care in manufacture; no stage needs to be unduly hurried, involving greater risk of loss.

Another way is to specify that a certain number of "overs" shall be made, advising with the manufacturer as to which pieces should be so duplicated.

Finally, use the greatest care at the building, and when a piece is broken, report its loss to the manufacturer immediately, sending the section letter and number which appear on every piece.

THE ARCHITECT'S WORK IN RELATION TO THE MANUFACTURER

General. In considering the use of Architectural Terra Cotta, the architect should realize that it involves no rearrangement of his office system. In fact his own detail work will be materially decreased. Practically the only drawings he needs to supply are a plan, elevations, and a section that will show the projections; ornament should be indicated. From these drawings, no matter how completely worked out, the manufacturer's draughting department makes entirely new and complete drawings showing what experience has proved to be the most advisable construction. These drawings are, of course, submitted to the architect for approval. However, the architect should be slow to make even what appears to be a minor change, without discussing the matter with the manufacturer. He should be particularly slow to rearrange the jointing; this has been arranged by the manufacturer with the most painstaking care and in the manner that will produce the very best results.

Particular Points of Construction. Especially in the matter of fluted columns and very large pilasters should the architect rely upon the manufacturer's judgment. Fluted columns are particularly hard to make with a satisfactory mechanical appearance unless the joints are so arranged that the material may be rubbed and cut to a perfect fit. In very wide pilasters the courses should alternate with one and two joints. Then, by making the pieces larger than necessary and grinding to size, the joints will be straight and close, and the effect excellent.

Heavily rusticated ashlar is peculiarly adapted to Architectural Terra Cotta construction. Frequently invisible joints are possible, and the natural shadows of the rustication often obviate the necessity of rubbing and cutting with its attendant expense.

Specify Surface. The architect should always specify the surface desired. The surfaces are three in number: — Standard, Matt Glaze and Full Glaze.

The Standard finish may be compared to smooth limestone, and is the surface generally employed for grays, reds and browns.

The Matt Glaze is a dull, absolutely impervious glaze, similar in texture to smooth but unpolished marble. Generally used for white, creams and polychrome.

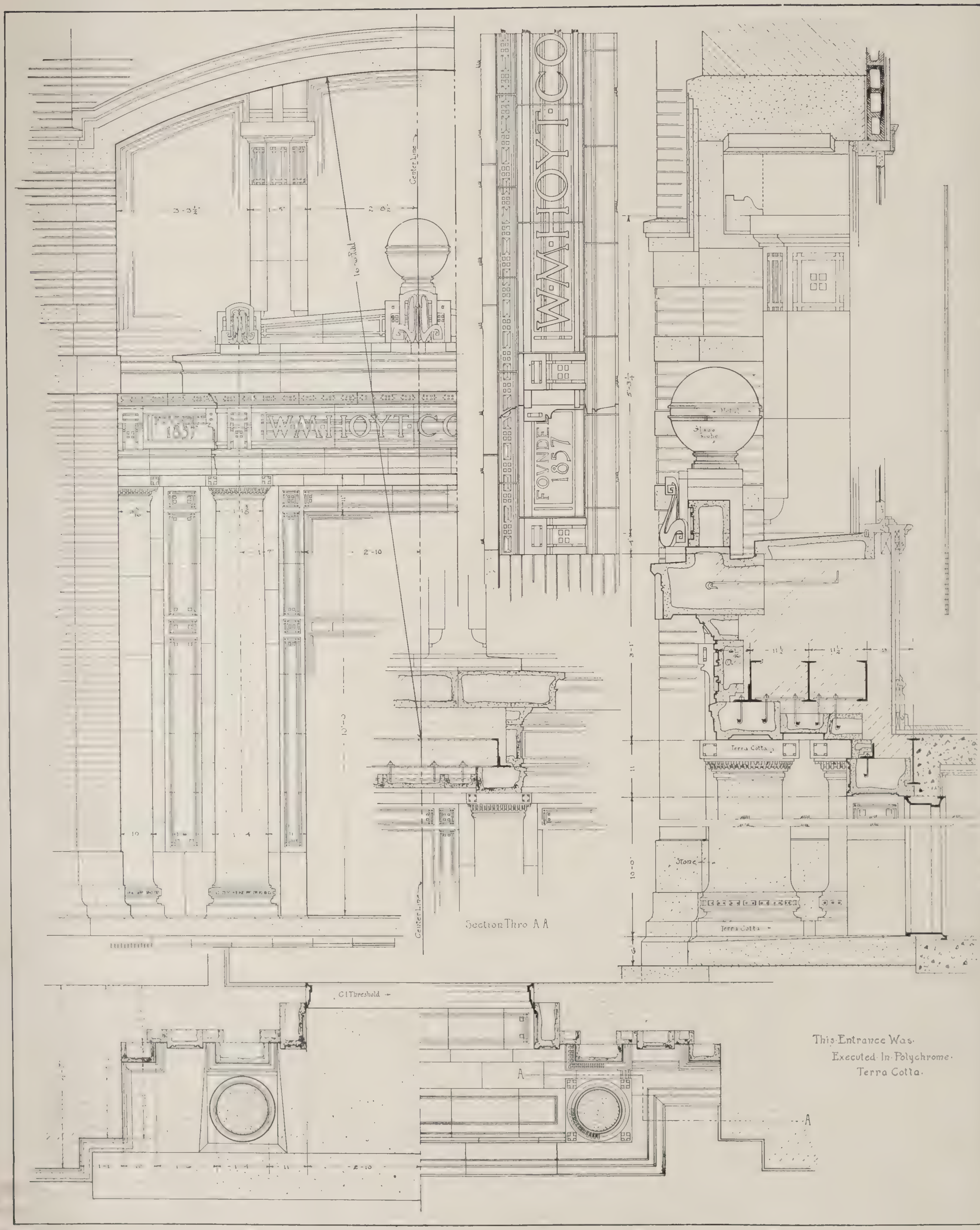
The Full Glaze is similar to highly polished marble. It is used for white and creams, generally for buildings to be erected in smoky localities because it is the surface most easily cleaned.

As stated, polychrome is usually made in matt glaze but the surfaces may be combined to some extent if desired.

Never specify semi-glaze. This may be applied to either the standard or the matt glaze material, and to avoid confusion the term has been eliminated.

DECORATIVE AND STRUCTURAL

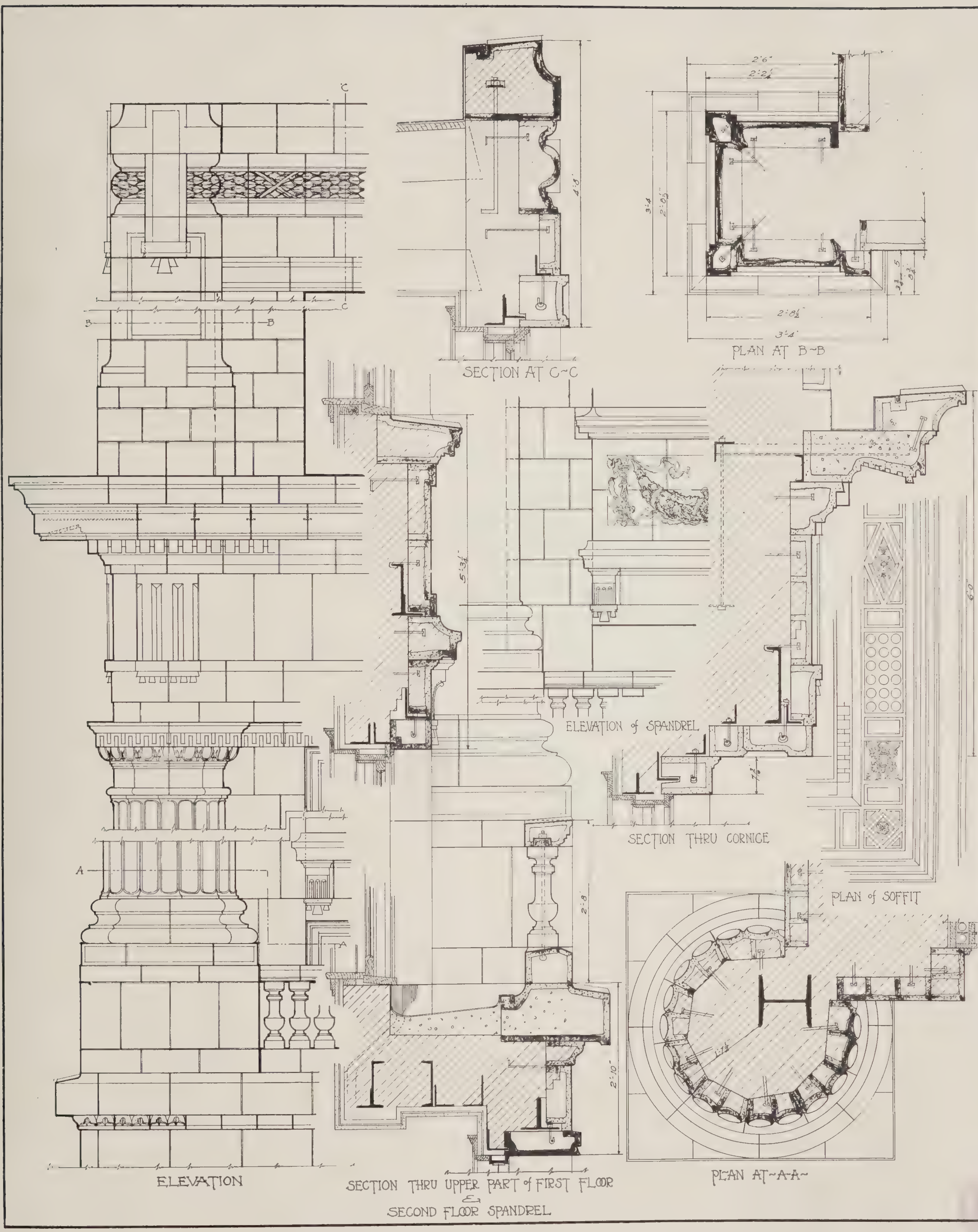
Finally, the architect should realize that while Architectural Terra Cotta is a decorative material, with possibilities for modeling and color treatment that occur in no other medium, it is a thoroughly practical structural material as well, and in this quality lies its greatest value.



TERRA COTTA DETAILS, WAREHOUSE, CHICAGO, ILL.

Nimmons & Fellows, Architects.

Work executed by the American Terra Cotta & Ceramic Co.

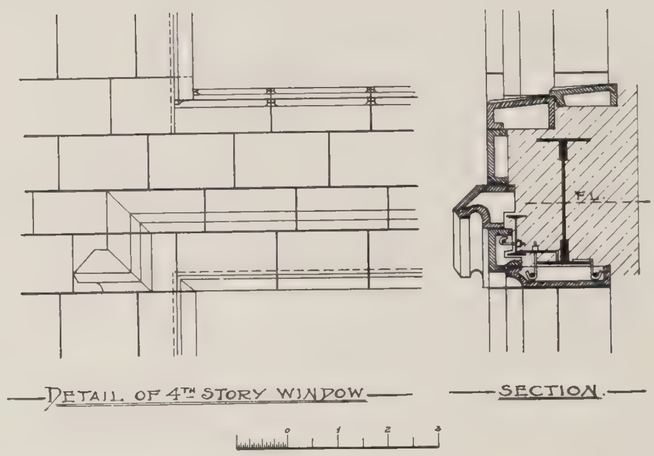


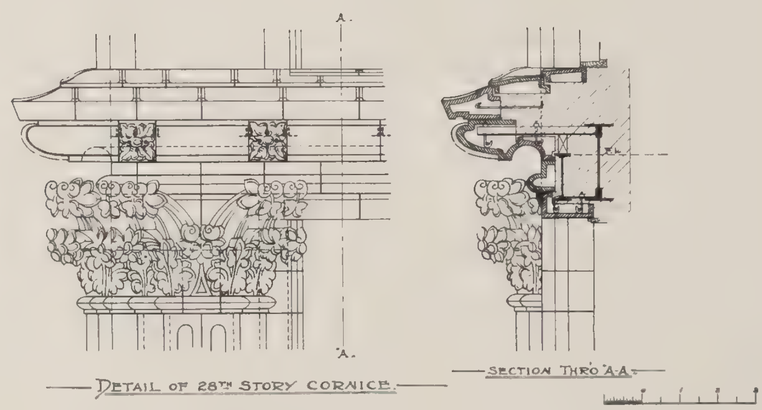
TERRA COTTA DETAILS, SECOND NATIONAL BANK BUILDING, RICHMOND, IND.

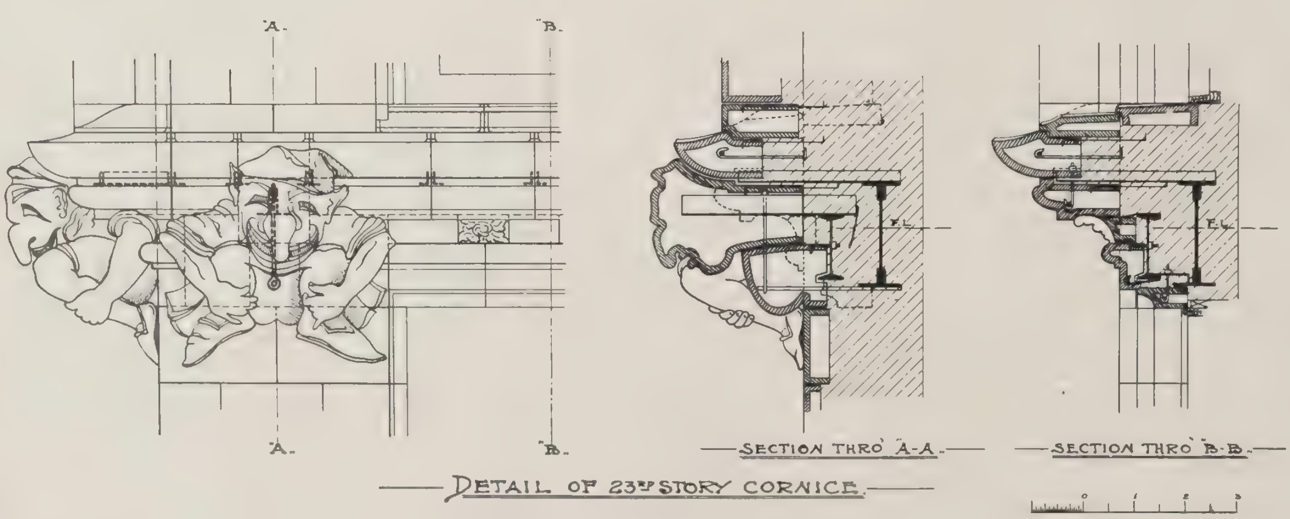
Albert Pretzinger, Architect.

Work executed by the American Terra Cotta & Ceramic Co.

ENTIRELY OF MATT CREAM GLAZED ATLANTIC ARCHITECTURAL TERRA COTTA FROM THE SIDEWALK UP.



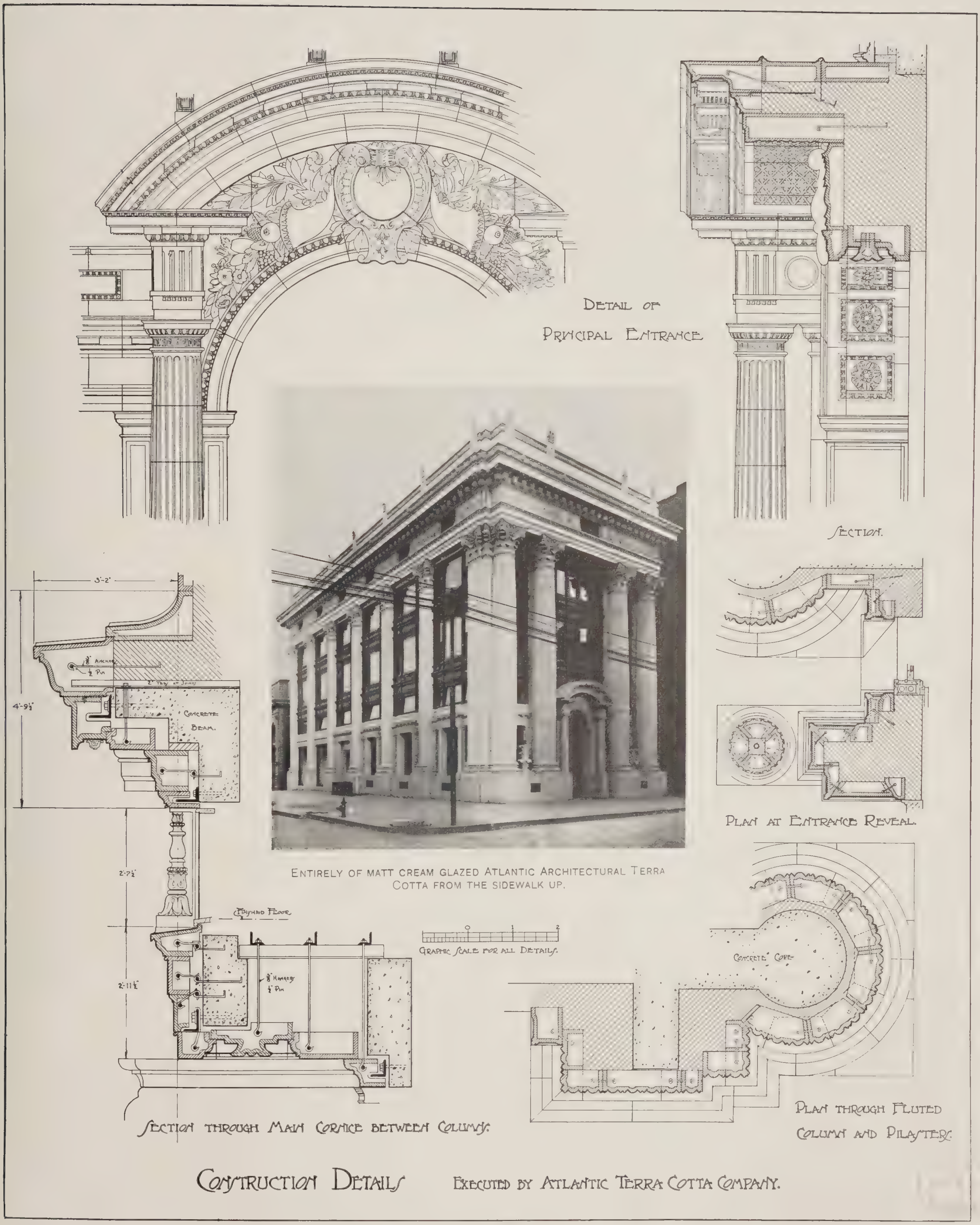




LIBERTY TOWER, NEW YORK CITY.

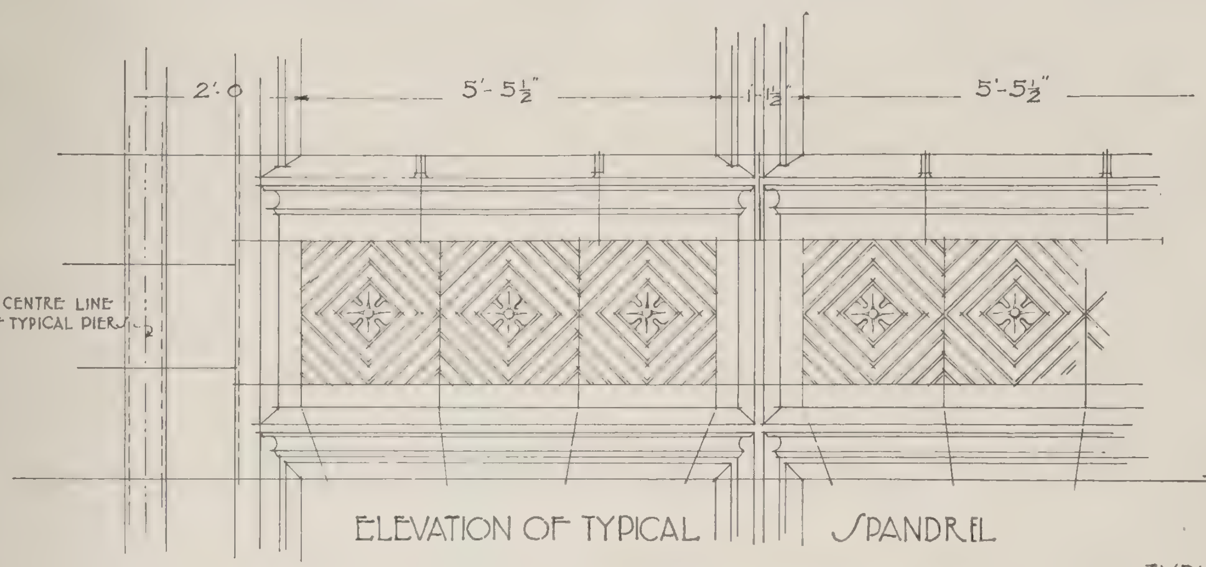
Henry Ives Cobb, Architect.

Terra Cotta executed by the Atlantic Terra Cotta Co.

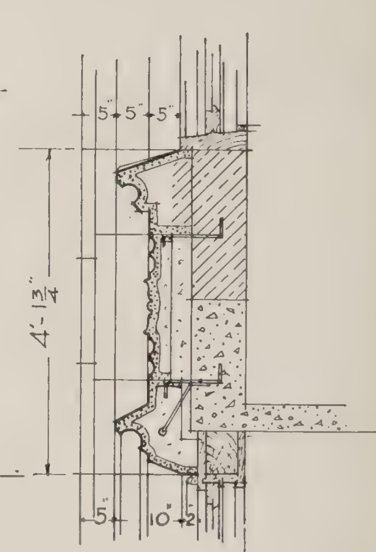


DAYTON DAILY NEWS BUILDING, DAYTON, O.

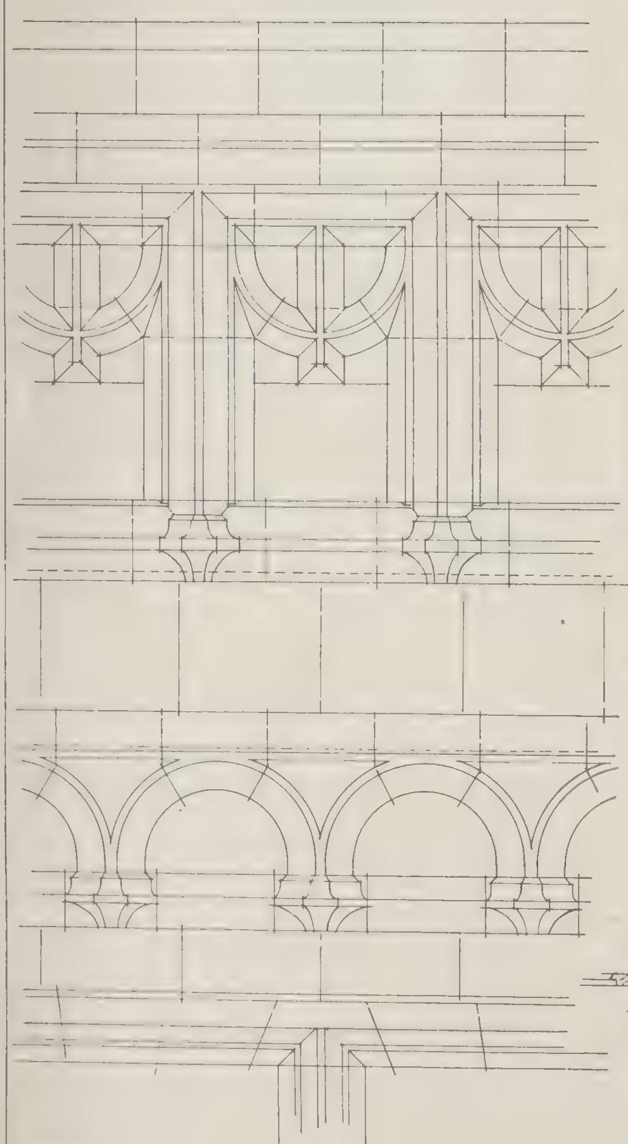
A. Pretzinger, Architect. Terra Cotta executed by the Atlantic Terra Cotta Co.



ELEVATION OF TYPICAL SPANDREL

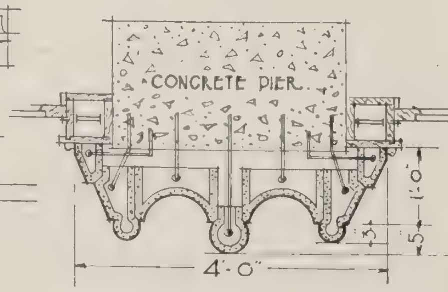


TYPICAL SPANDREL SECTION

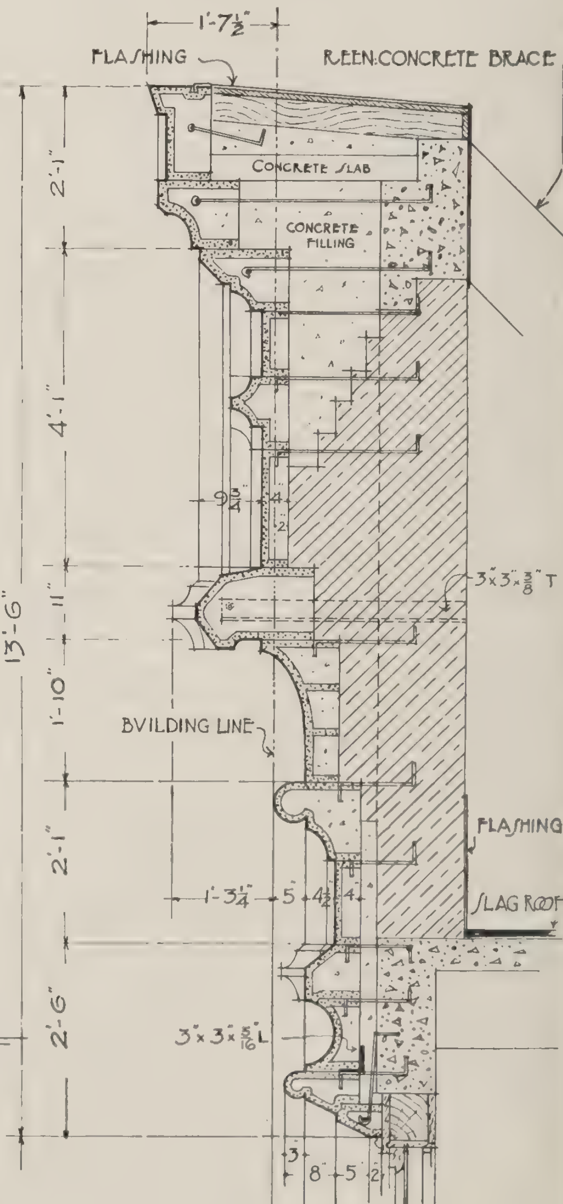


PART ELEVATION OF MAIN CORNICE

ENTIRELY OF GRAY ATLANTIC ARCHITECTURAL TERRA COTTA FROM THE SIDEWALK UP.



TYPICAL PLAN OF PIERS

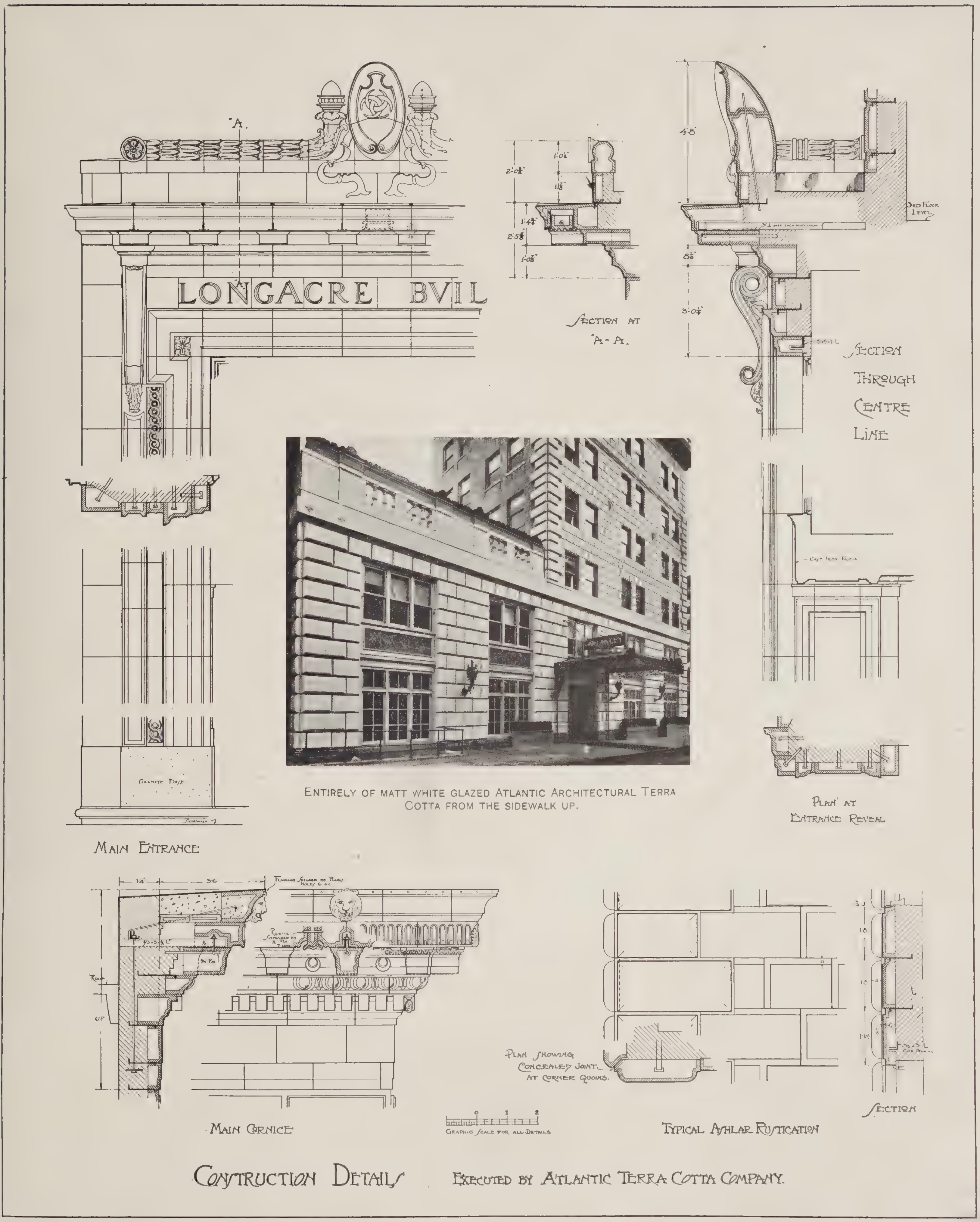


TYPICAL SECTION THRU' MAIN CORNICE

PEOPLE'S TRUST CO. BUILDING, PHILADELPHIA, PA.

Sauer & Hahn, Architects.

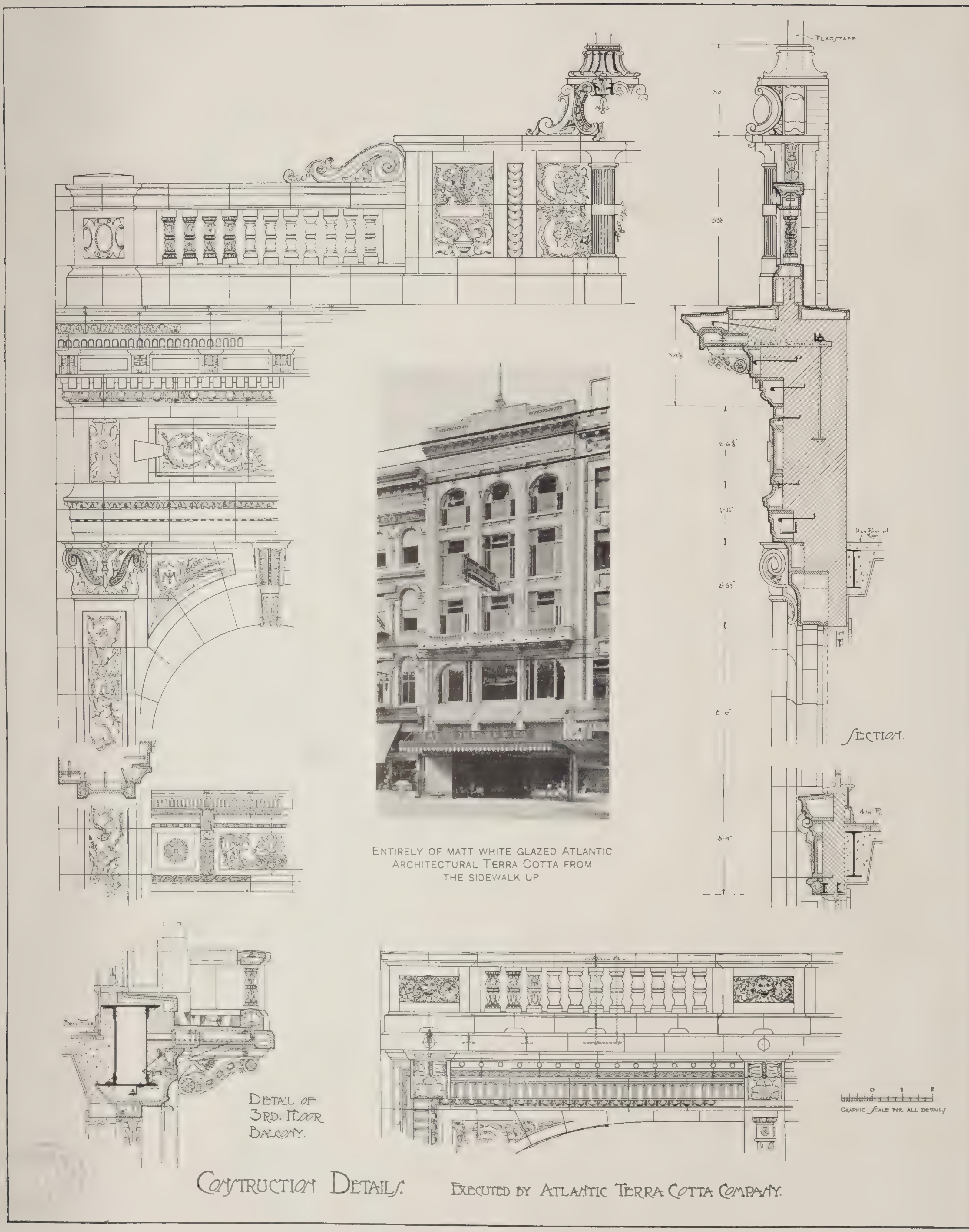
Terra Cotta executed by the Atlantic Terra Cotta Co.



PUTNAM BUILDING, NEW YORK CITY

Charles A. Platt, Architect.

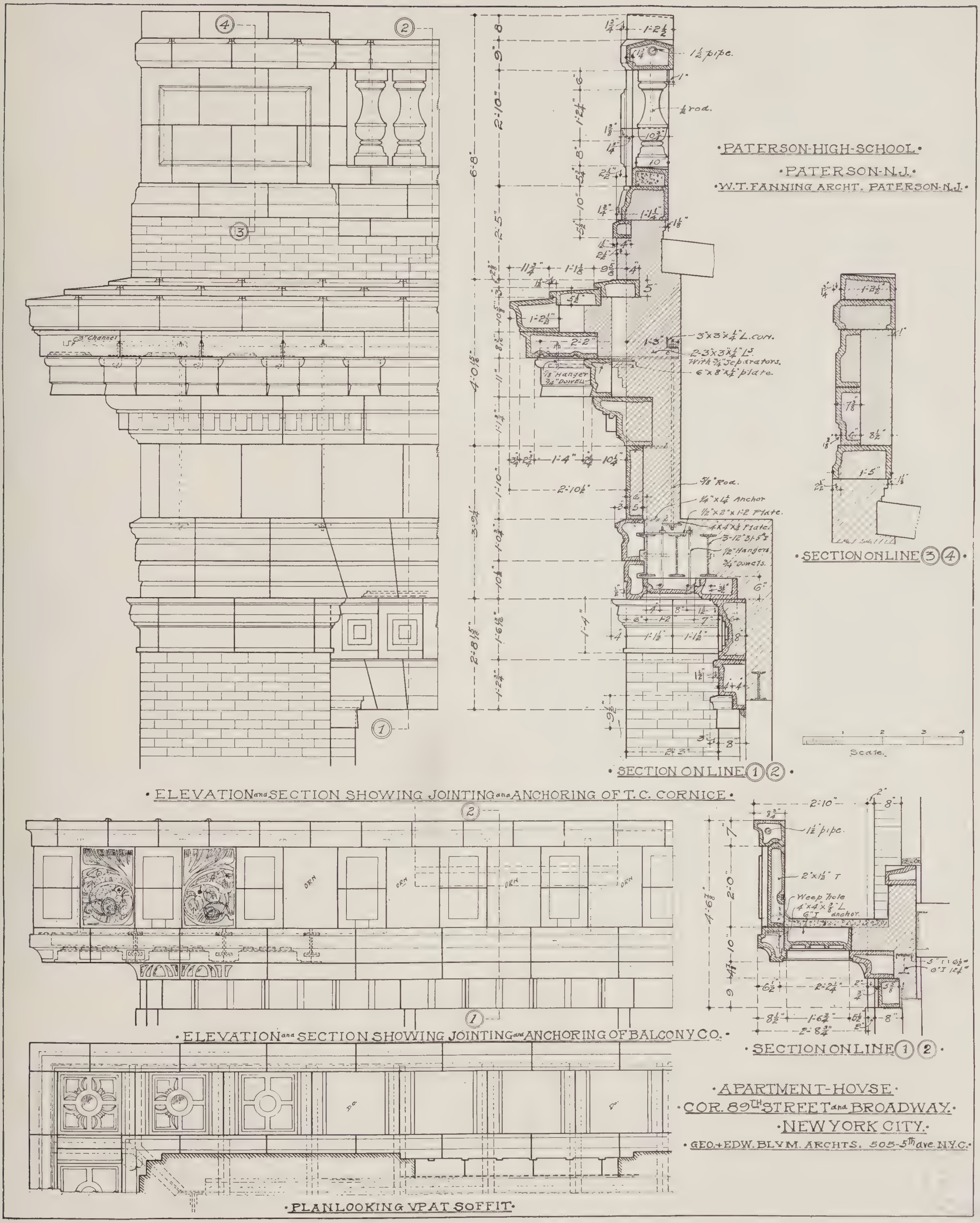
Terra Cotta executed by the Atlantic Terra Cotta Co.



MAYER ISRAEL STORE, NEW ORLEANS, LA.

Favrot & Livaudais, Architects.

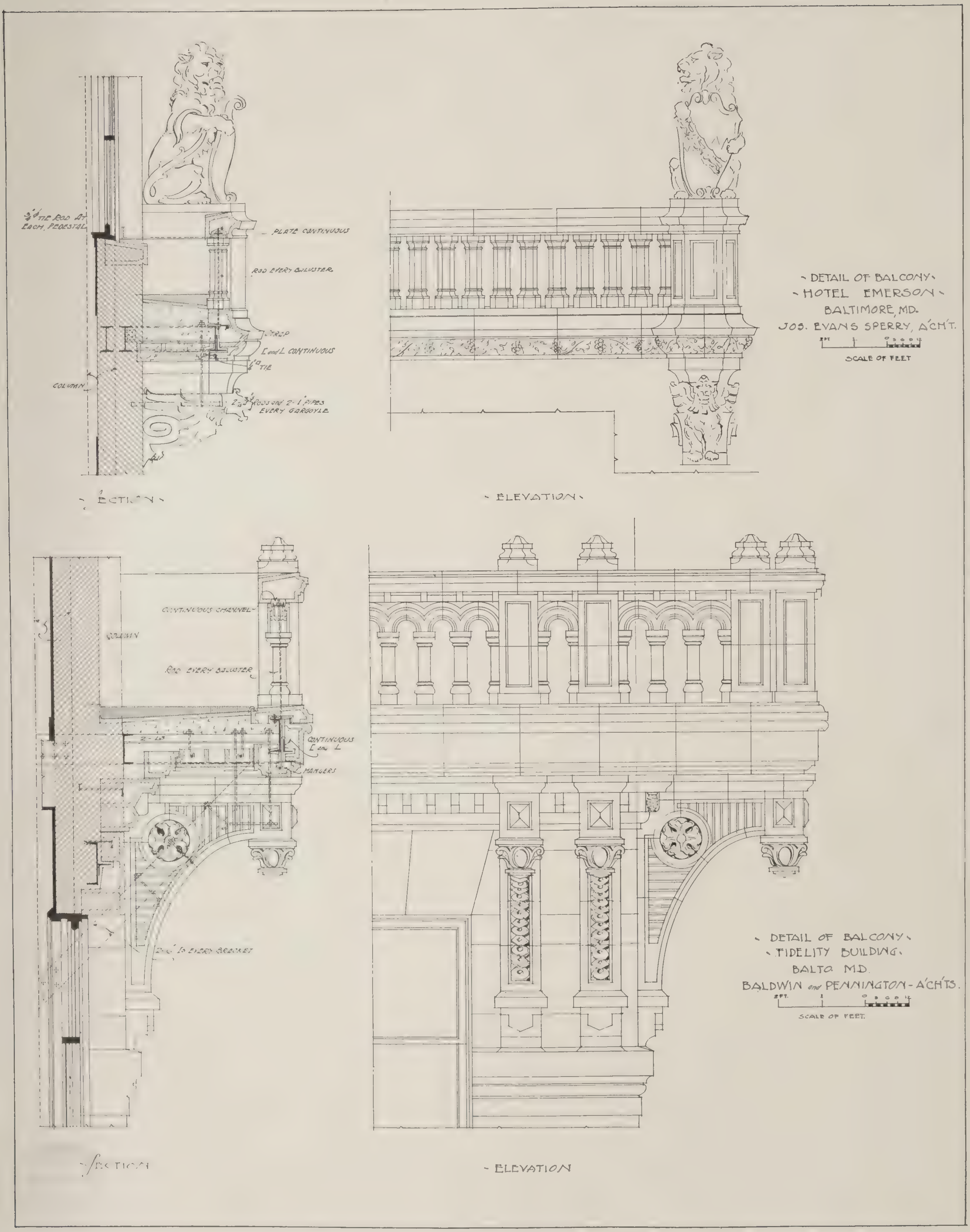
Terra Cotta executed by the Atlantic Terra Cotta Co.



TERRA COTTA DETAILS, APARTMENT HOUSE, NEW YORK CITY.

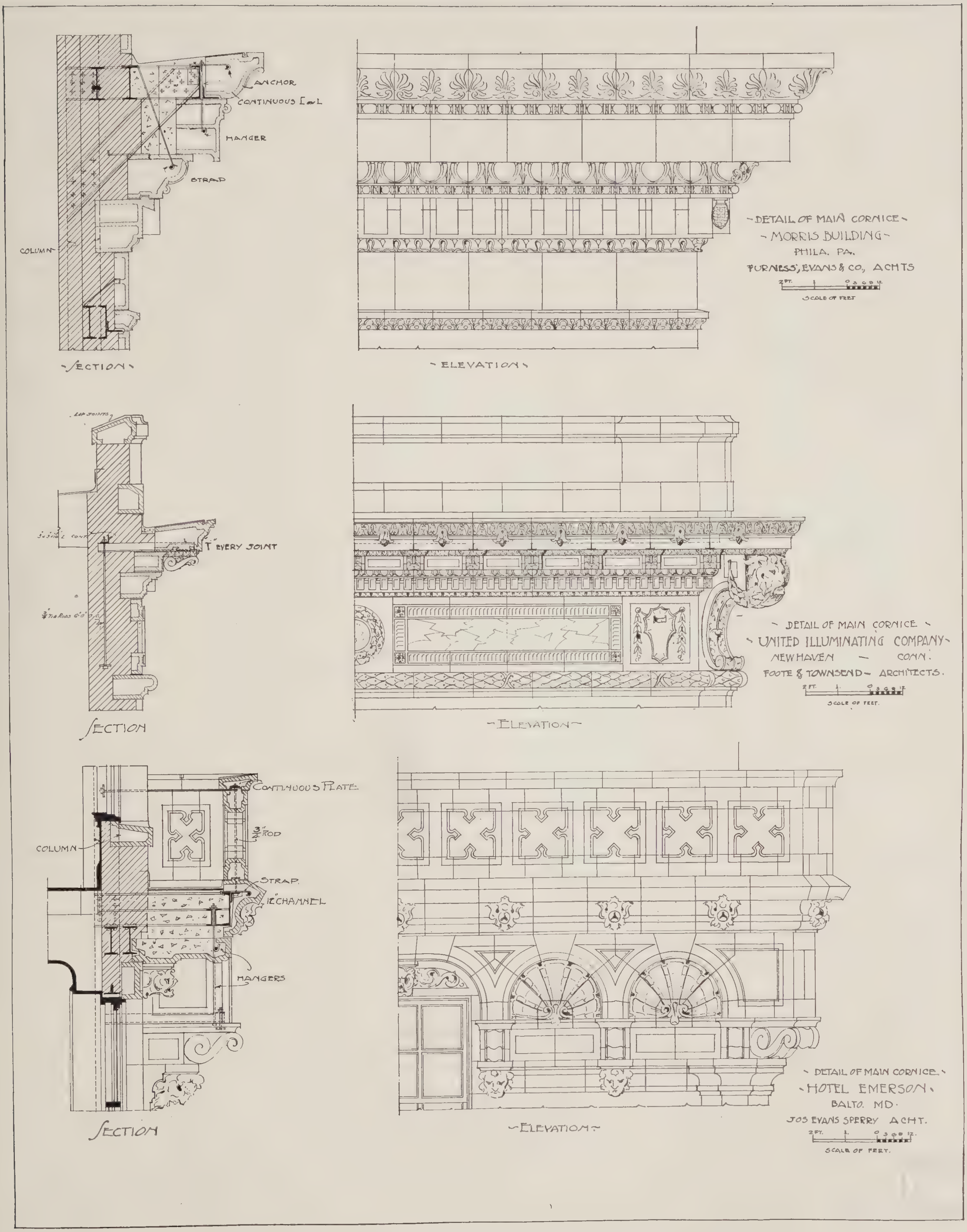
Geo. & Edw. Blum, Architects.

Work executed by the Brick, Terra Cotta & Tile Co.



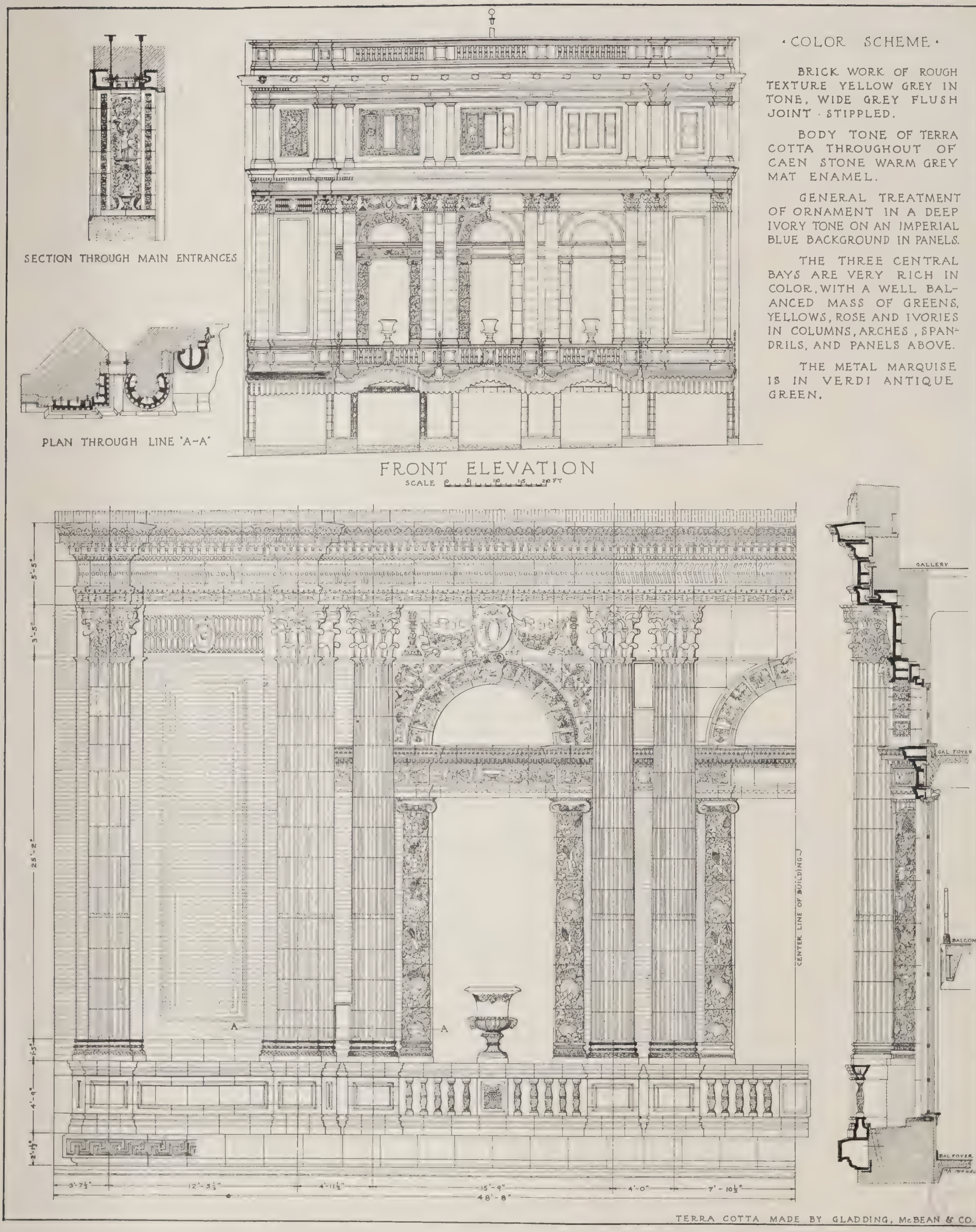
TERRA COTTA DETAILS OF BALCONIES FROM TWO BUILDINGS

Work executed by the Conkling-Armstrong Terra Cotta Company



TERRA COTTA DETAILS OF CORNICES FROM THREE BUILDINGS

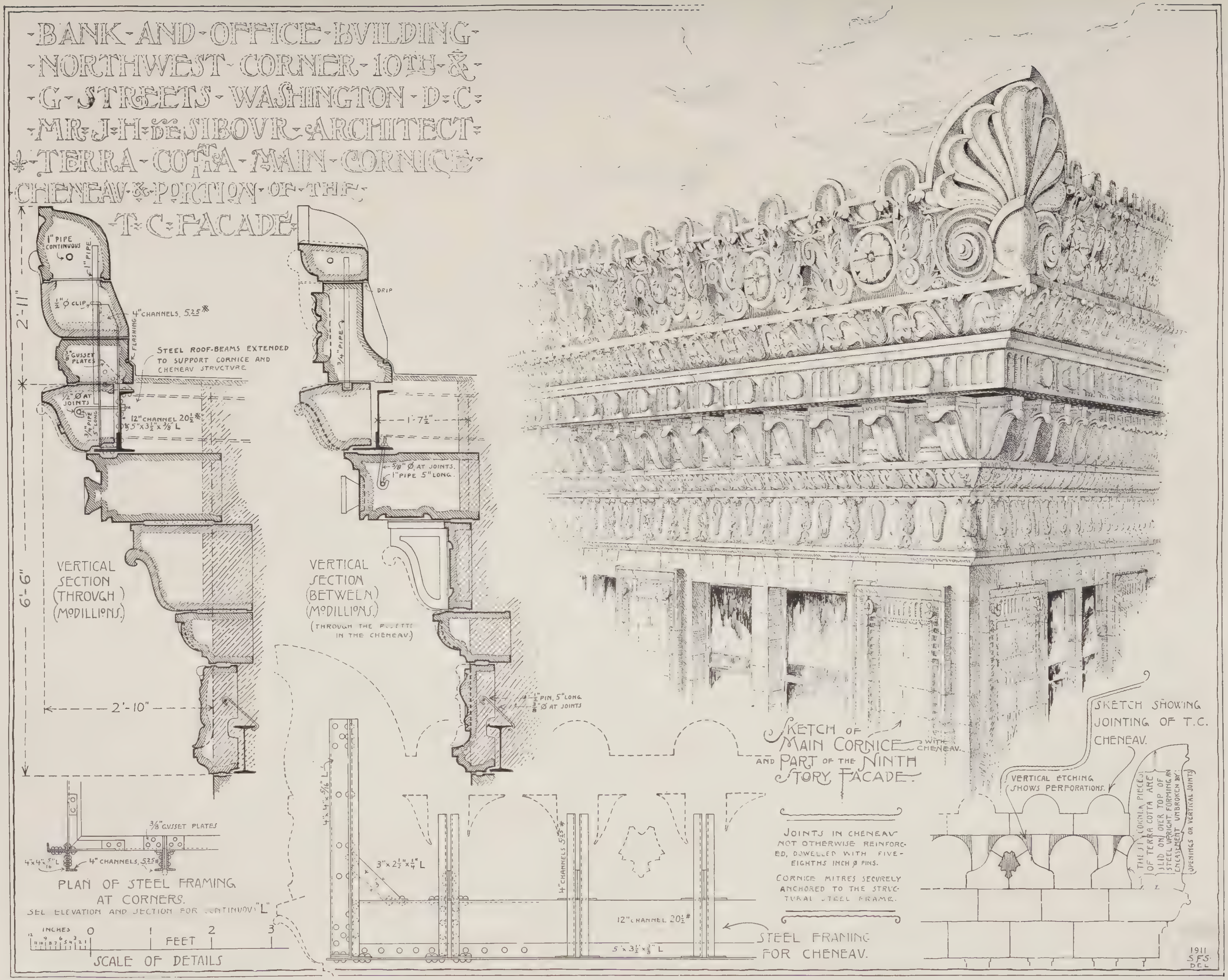
Work executed by the Conkling-Armstrong Terra Cotta Company



TERRA COTTA DETAILS, COLUMBIA THEATRE, SAN FRANCISCO, CAL.

Bliss & Faville, Architects.

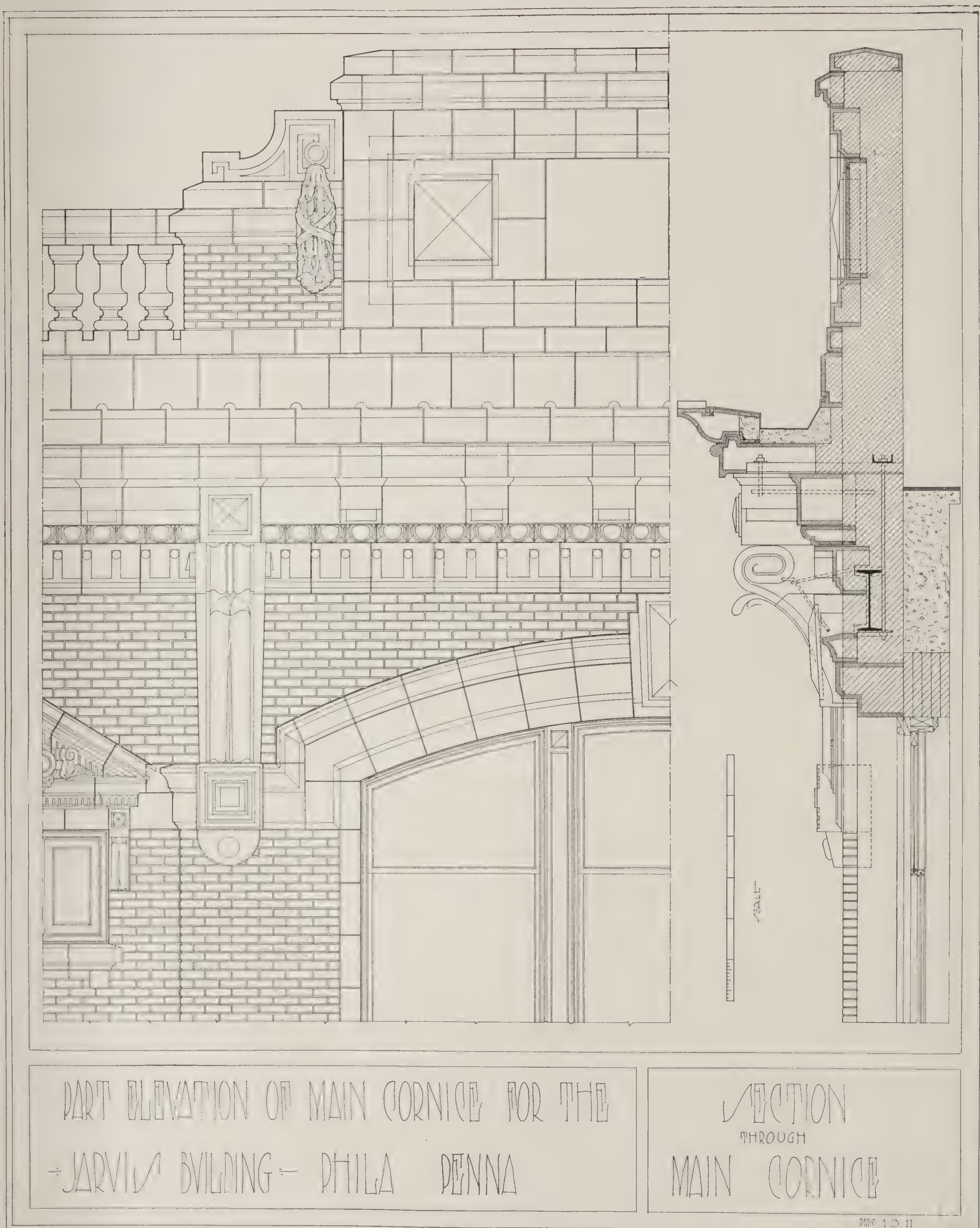
Work executed by the Gladding, McBean & Co.



TERRA COTTA DETAILS, BANK AND OFFICE BUILDING, WASHINGTON, D. C.

J. H. de Sibour, Architect.

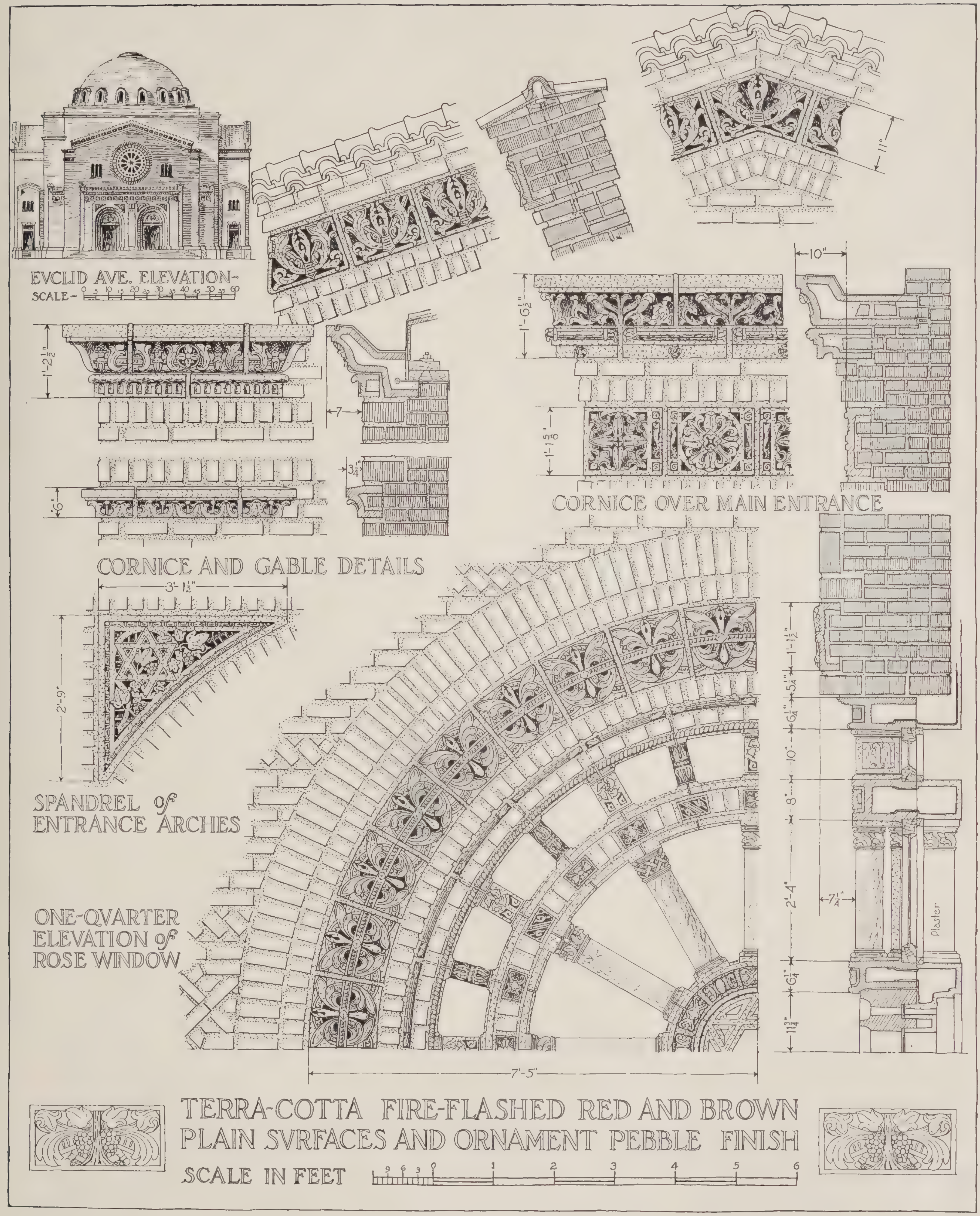
Work executed by the O. W. Ketcham Terra Cotta Works.



TERRA COTTA DETAILS, JARVIS BUILDING, PHILADELPHIA, PA.

Harris & Denny, Architects.

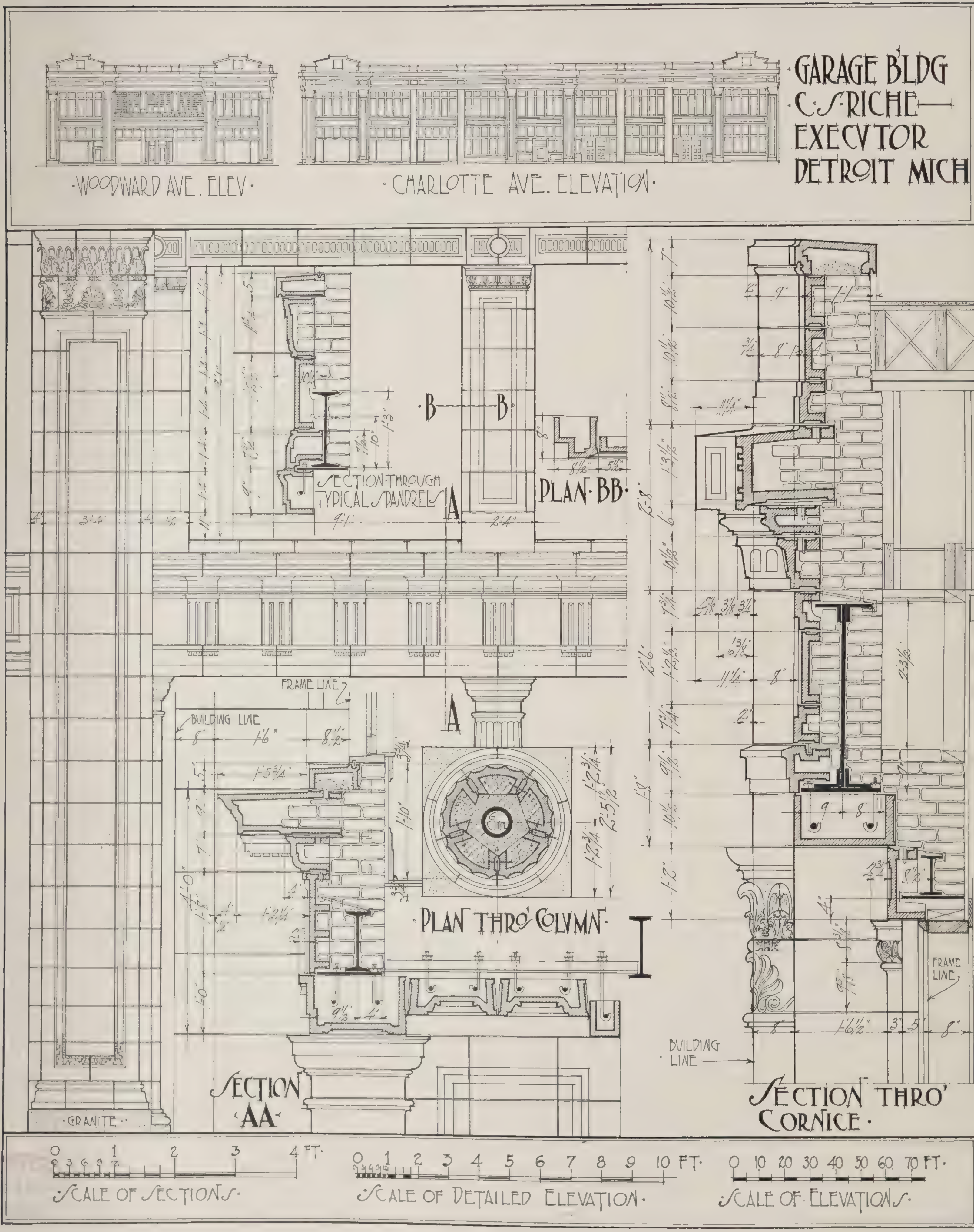
Work executed by the Maryland Terra Cotta Co.



TERRA COTTA DETAILS, EUCLID AVENUE TEMPLE, CLEVELAND, OHIO

Lehman & Schmidt, Architects.

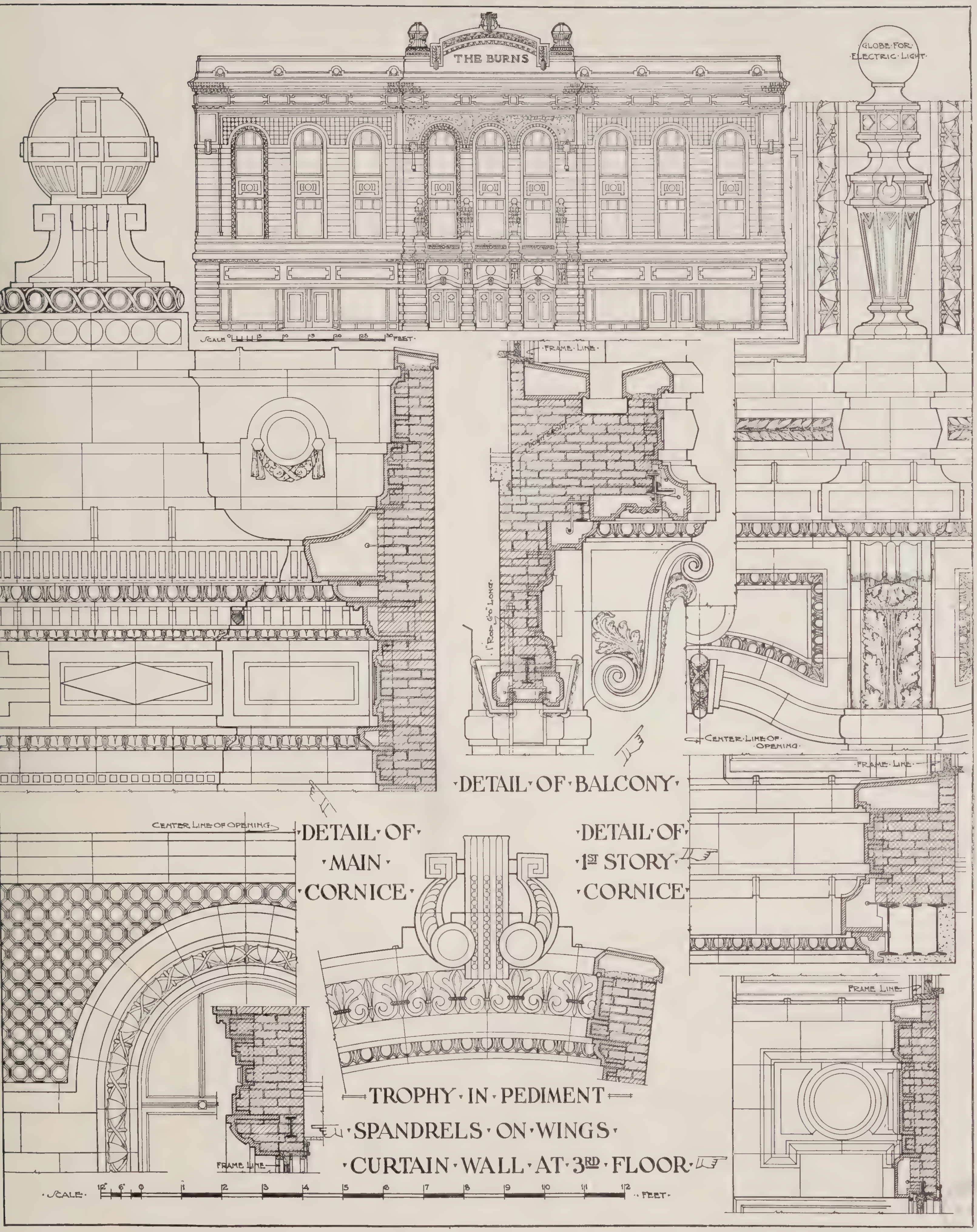
Work executed by the Northwestern Terra Cotta Co.



TERRA COTTA DETAILS, UNITED STATES MOTOR BUILDING, DETROIT, MICH.

Smith, Hinchman & Gryles, Architects.

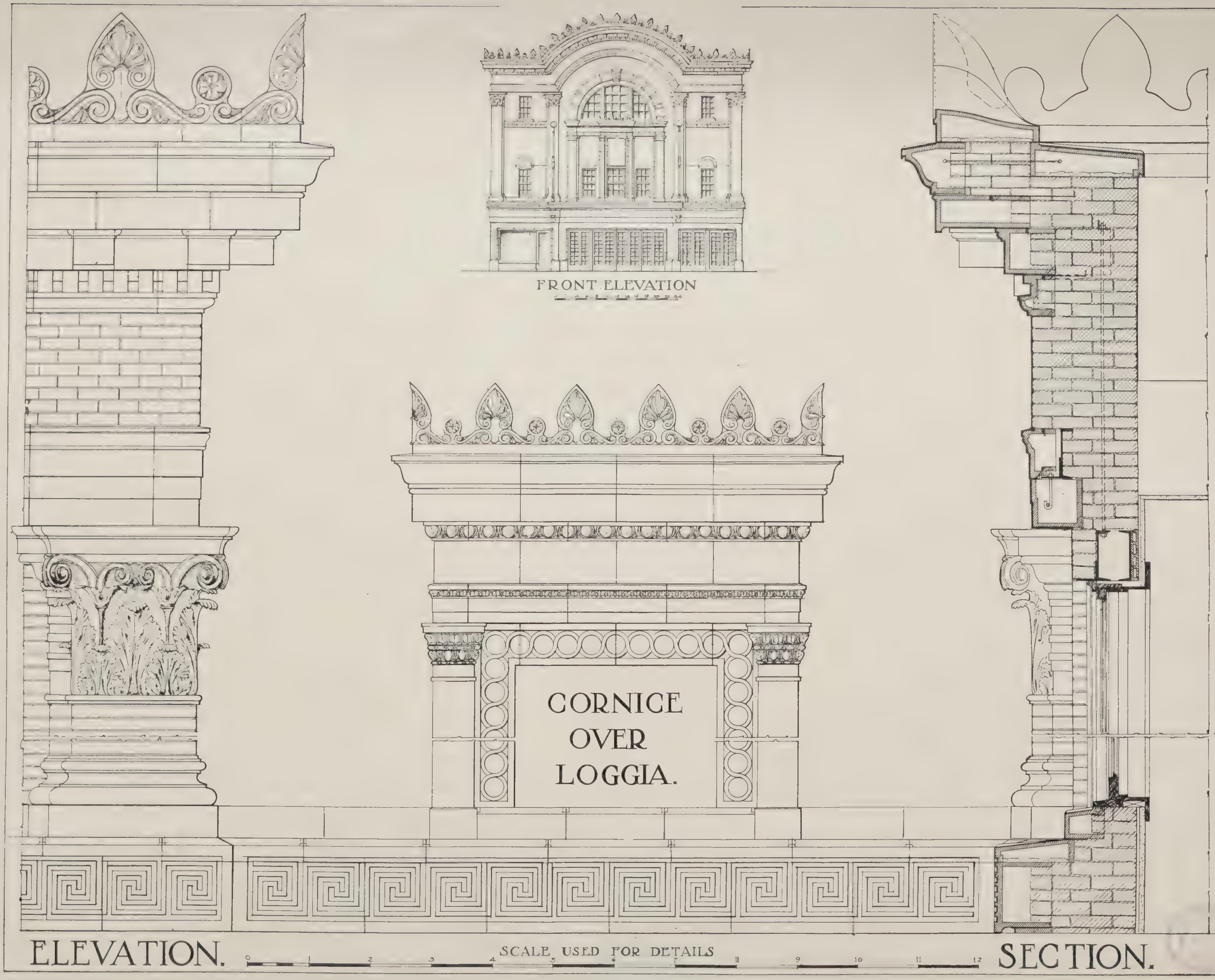
Work executed by the Northwestern Terra Cotta Co.



TERRA COTTA DETAILS, BURNS THEATRE, COLORADO SPRINGS, COLO.

Douglas & Hetherington, Architects.

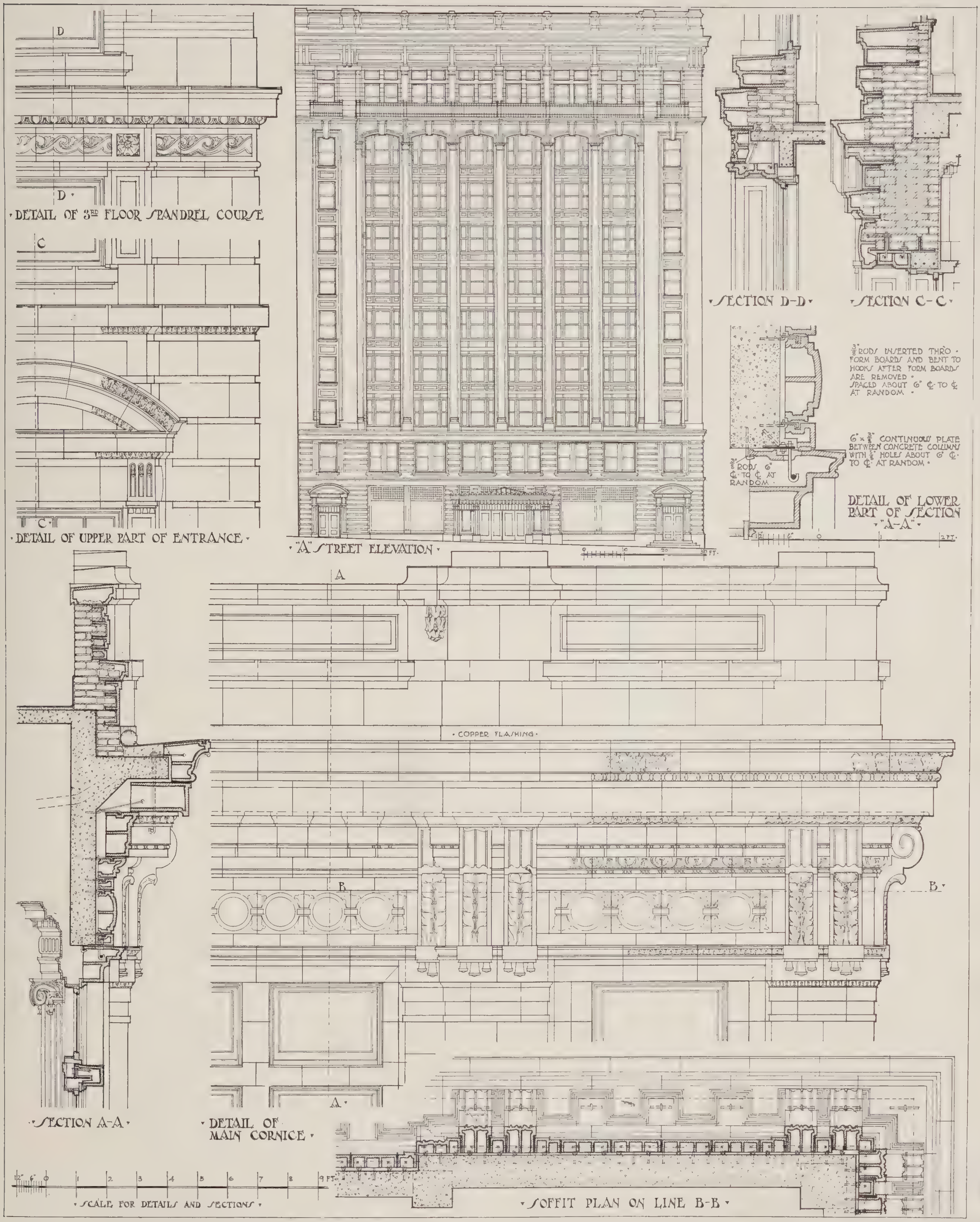
Work executed by the Northwestern Terra Cotta Co.



TERRA COTTA DETAILS, THE EVANSTON AMUSEMENT CO. THEATRE, EVANSTON, ILL.

J. E. O. Pridmore, Architect.

Work executed by the Northwestern Terra Cotta Co.

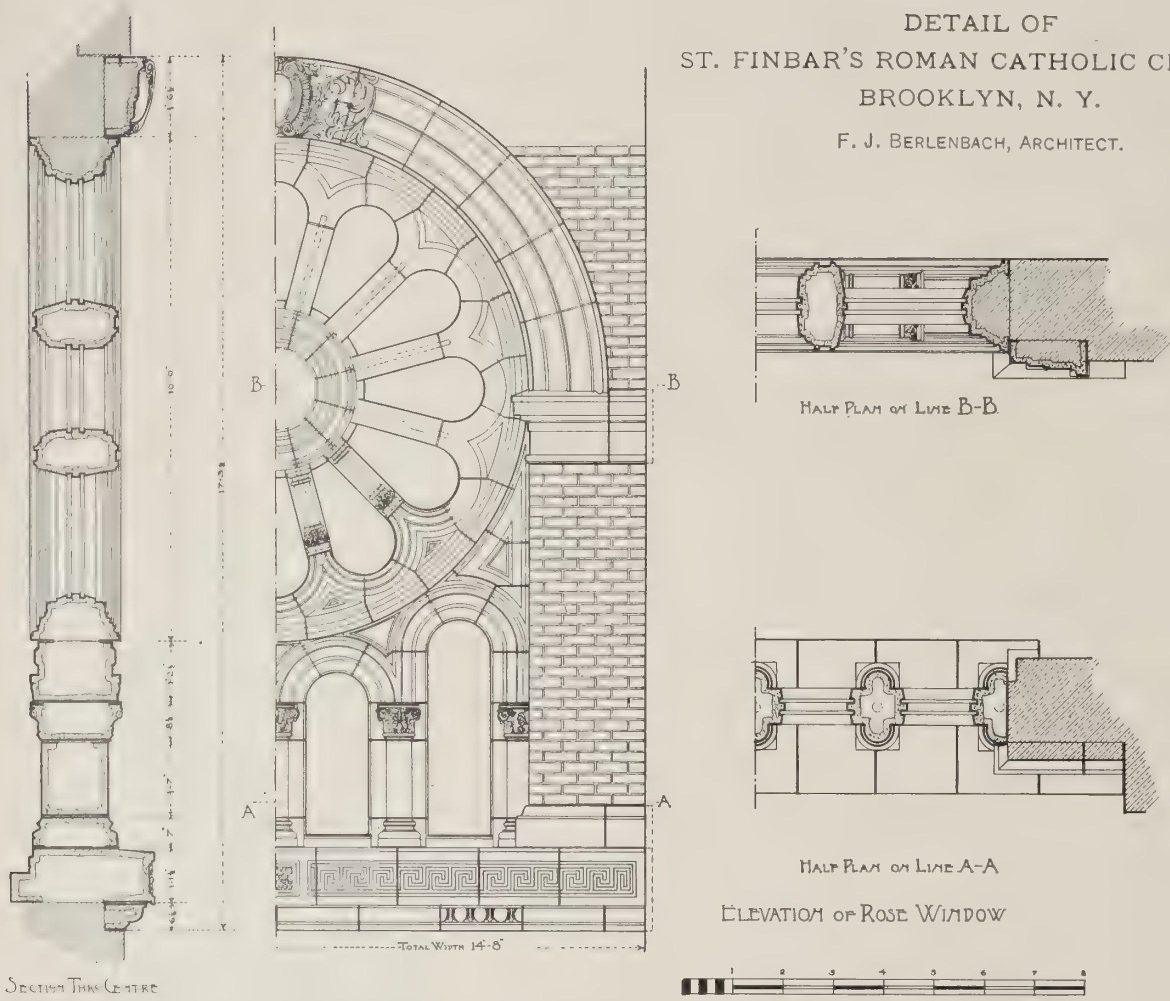


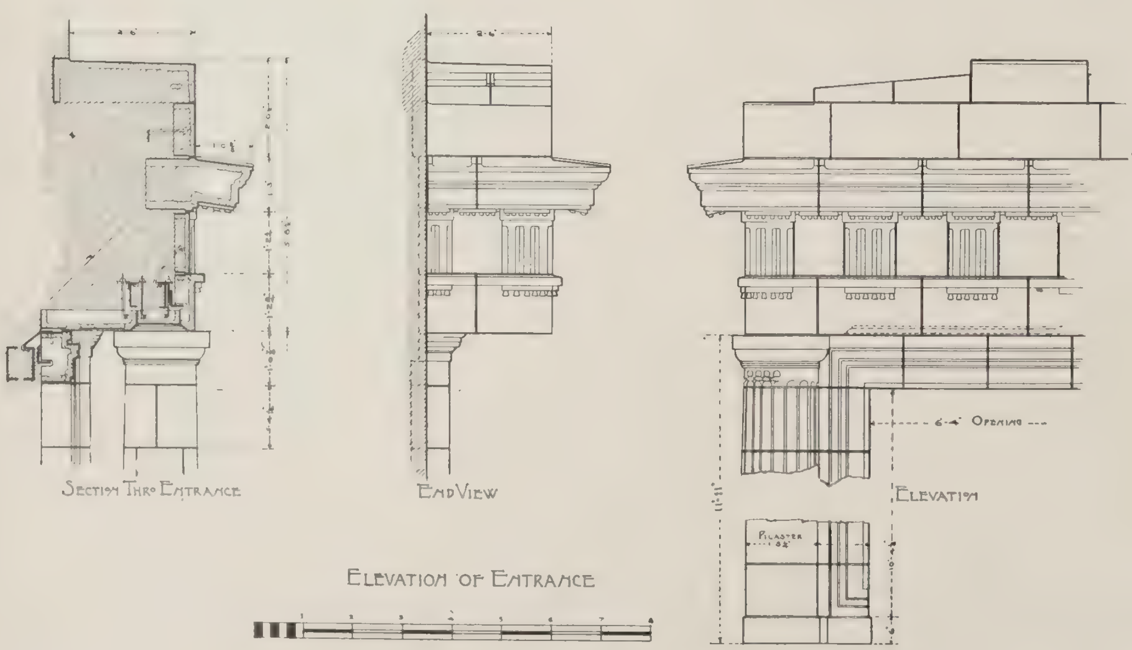
TERRA COTTA DETAILS, TACOMA COMMERCIAL CLUB AND WEYERHAEUSER TIMBER CO. BUILDING, TACOMA, WASH.

Potter & Merrill, Architects. Work executed by the Northwestern Terra Cotta Co.

DETAIL OF
ST. FINBAR'S ROMAN CATHOLIC CHURCH, BROOKLYN, N. Y.

F. J. BERLENBACH, ARCHITECT.





DETAIL OF PUBLIC SCHOOL, MIDDLETOWN, OHIO.

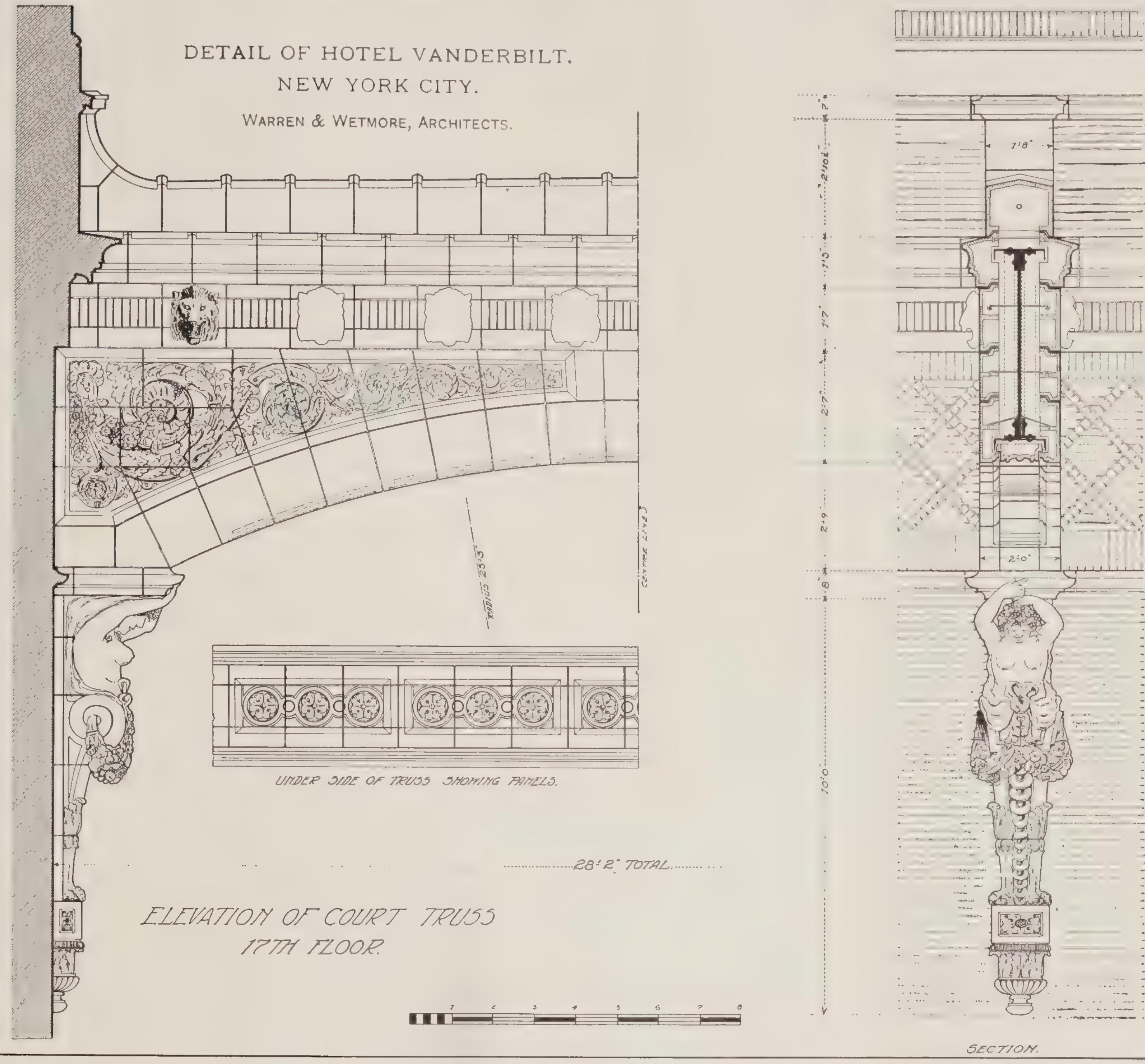
ALBERT PRETZINGER, ARCHITECT.

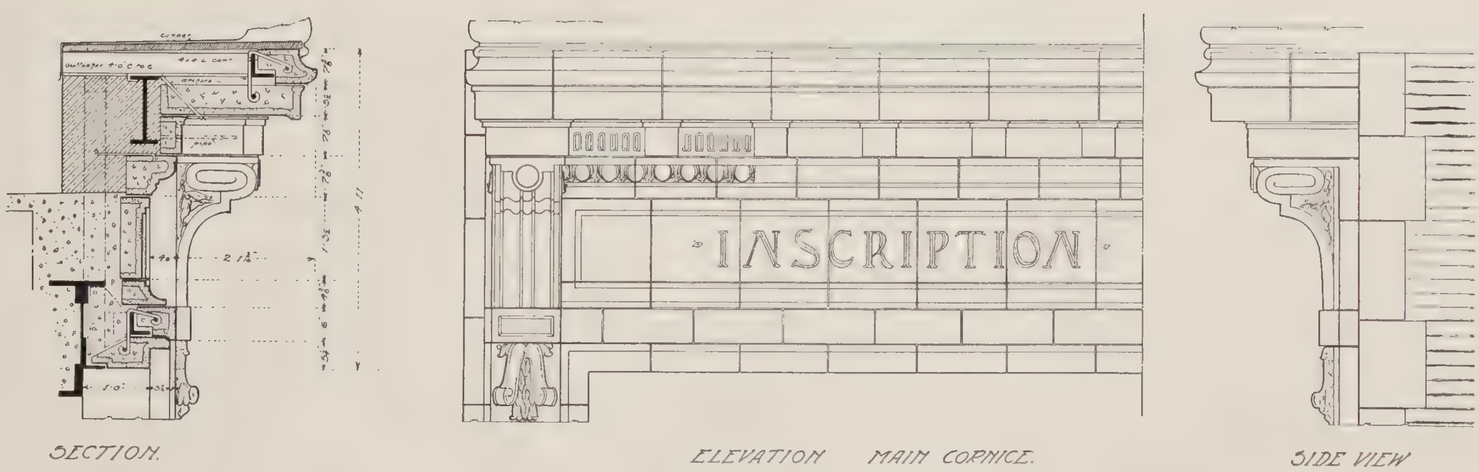
TERRA COTTA DETAILS FROM TWO BUILDINGS

Work executed by the New Jersey Terra Cotta Co.

DETAIL OF HOTEL VANDERBILT, NEW YORK CITY.

WARREN & WETMORE, ARCHITECTS.



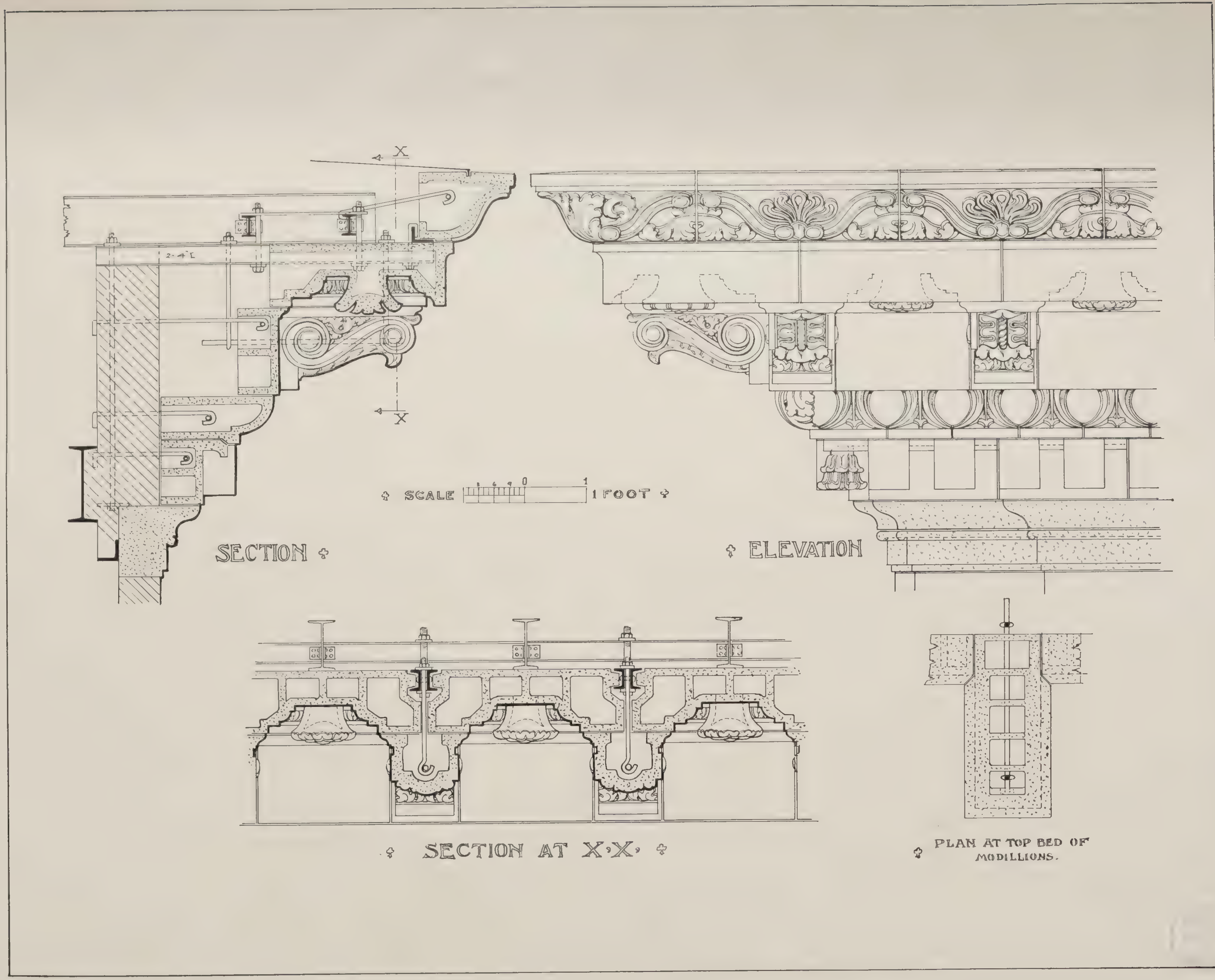


DETAIL OF STORE BUILDING, NORFOLK, VA.

FERGUSON, CALROW & TAYLOR, ARCHITECTS.

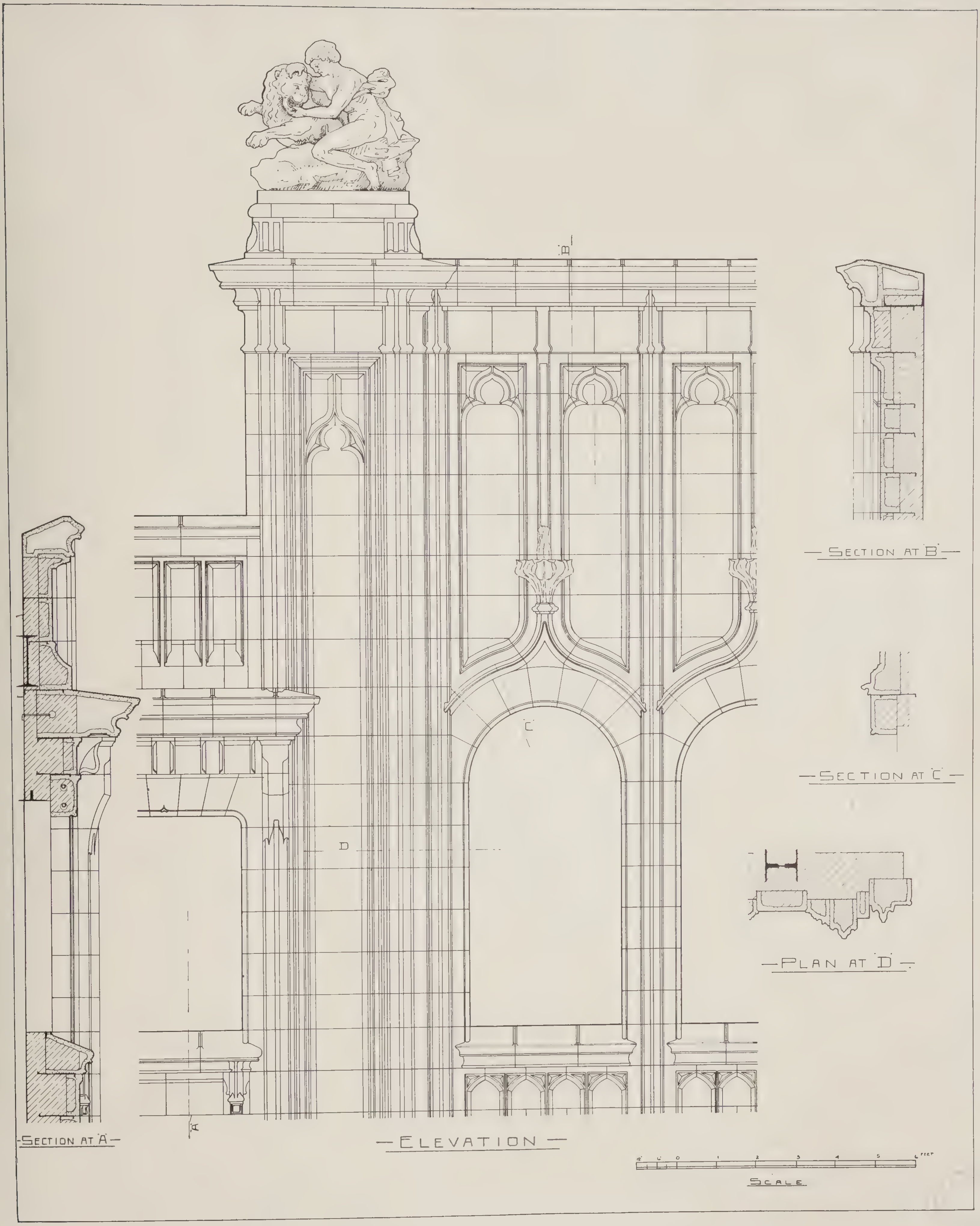
TERRA COTTA DETAILS FROM TWO BUILDINGS

Work executed by the New Jersey Terra Cotta Co.



TERRA COTTA DETAILS, MAIN CORNICE ON BUILDING AT 998 FIFTH AVE., NEW YORK CITY

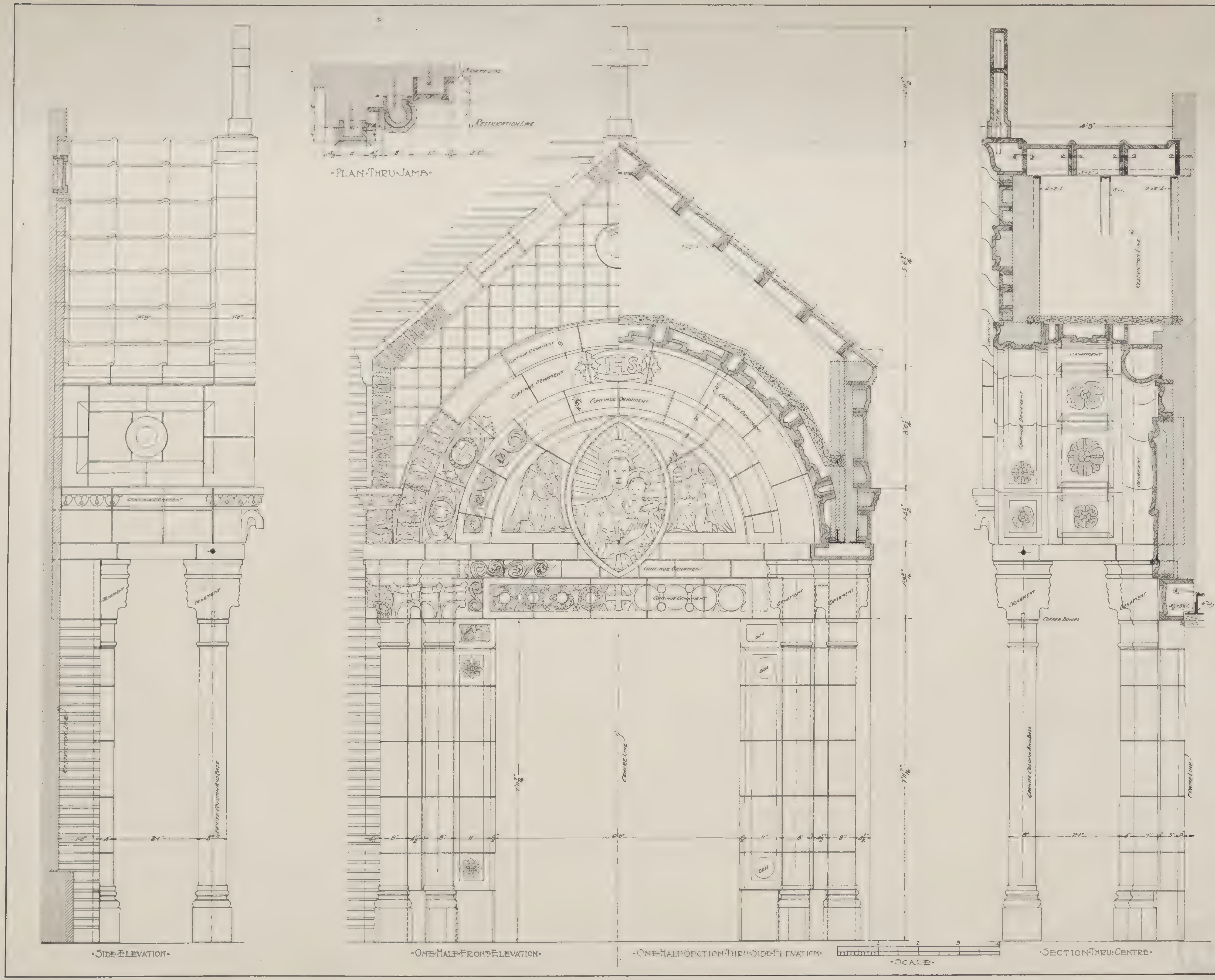
McKim, Mead & White, Architects. Work executed by the New York Architectural Terra Cotta Co.



TERRA COTTA DETAILS, PEERLESS MOTOR CAR CO., NEW YORK CITY

Francis H. Kimball, Architect.

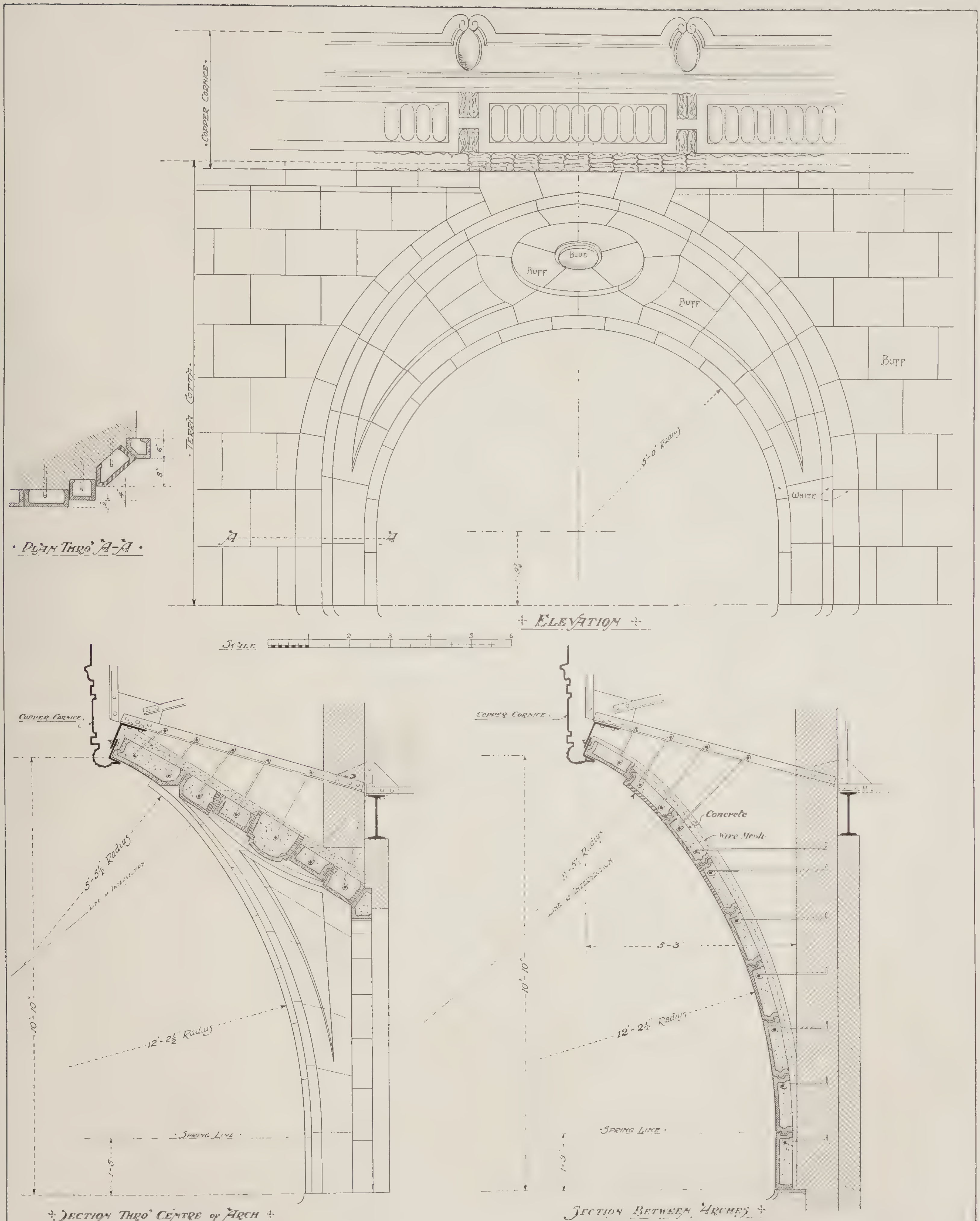
Work executed by the New York Architectural Terra Cotta Co.



TERRA COTTA DETAILS, CHURCH OF OUR LADY OF THE PRESENTATION, BROOKLYN, N. Y.

Frank J. Helme, Architect.

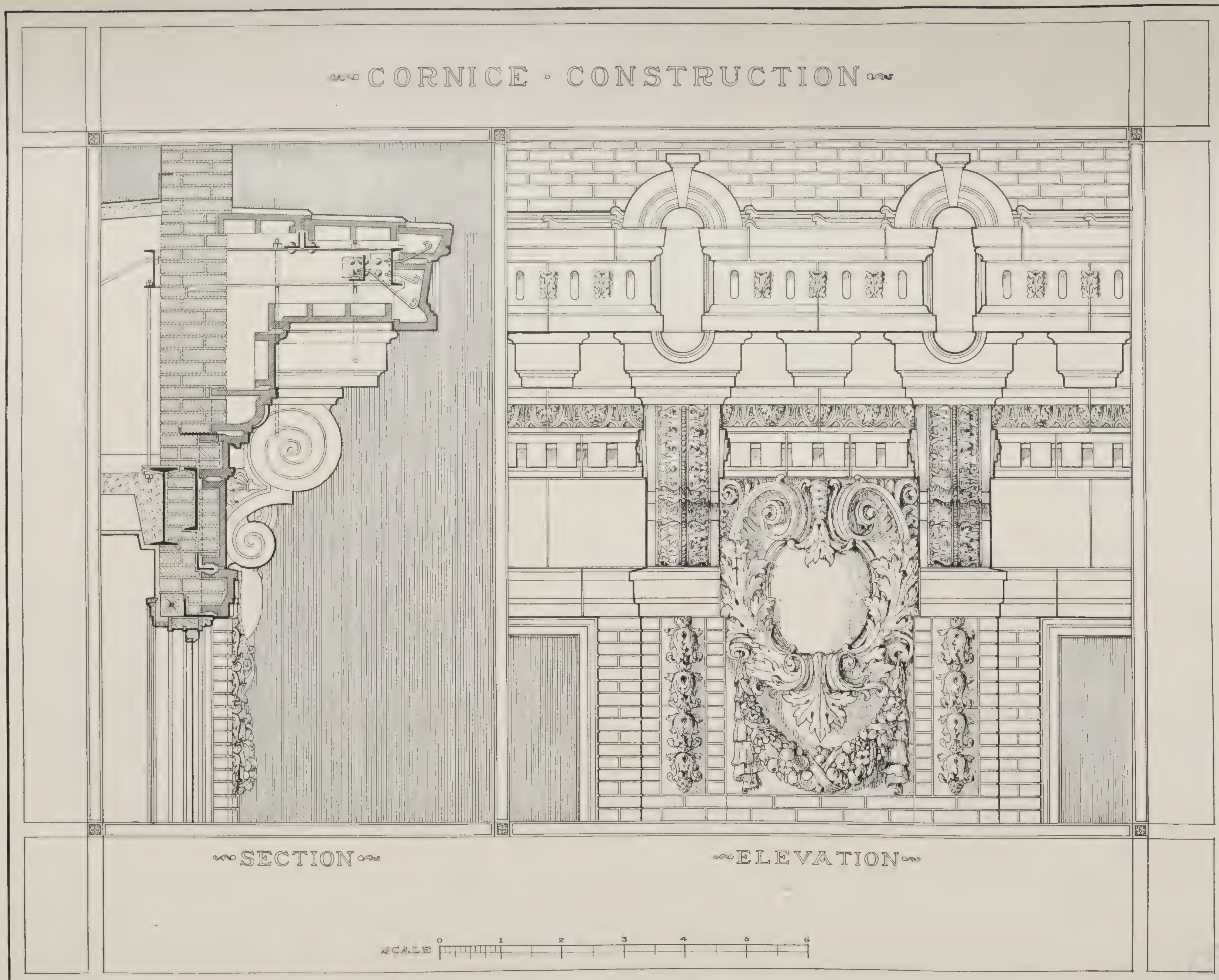
Work executed by the South Amboy Terra Cotta Co.



TERRA COTTA DETAILS, GERMAN-AMERICAN INSURANCE CO. BUILDING, NEW YORK CITY

Hill & Stout, Architects.

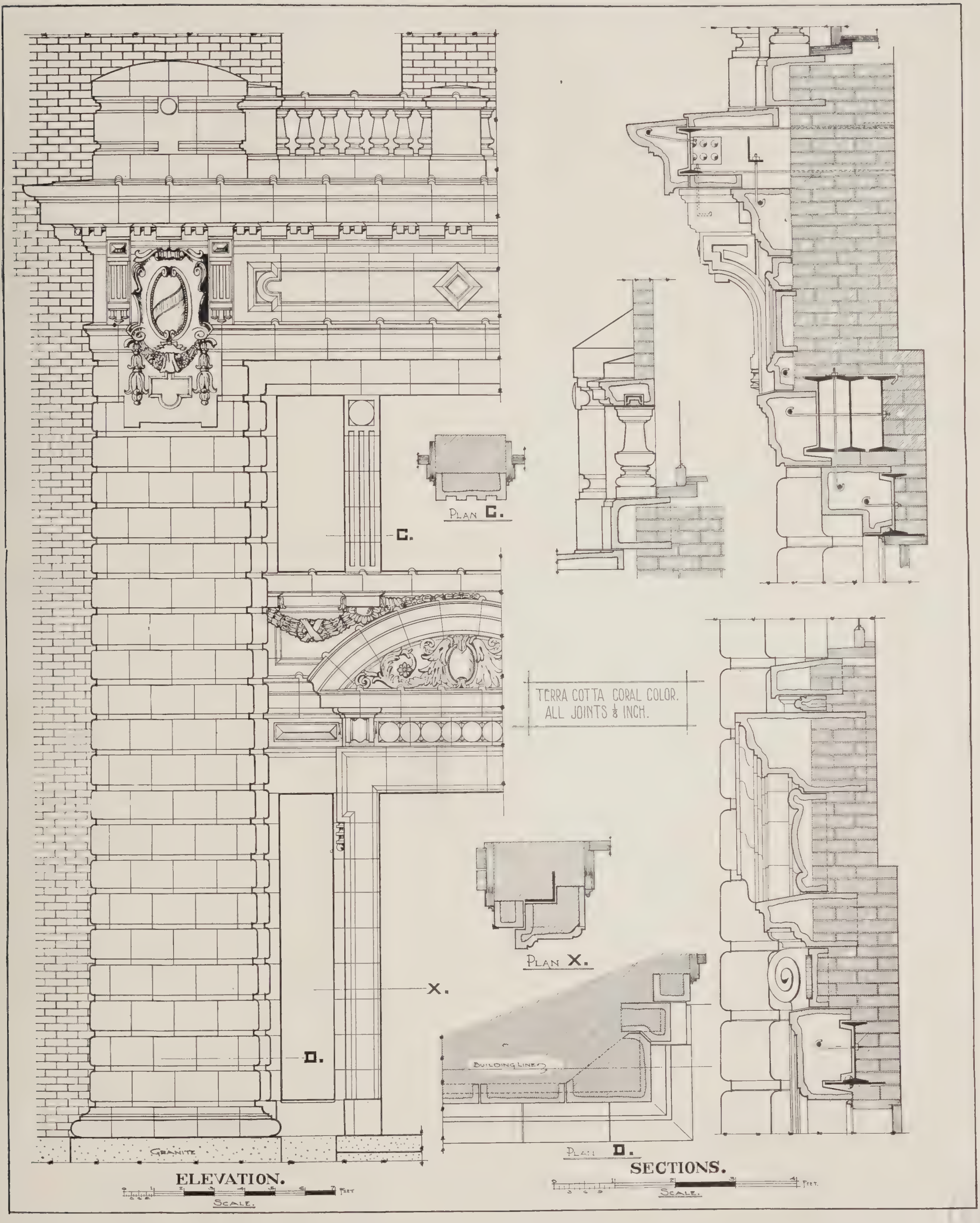
Work executed by the South Amboy Terra Cotta Co.



TERRA COTTA DETAILS, BEDELL BUILDING, SAN ANTONIO, TEX.

Atlee B. Ayres, Architect.

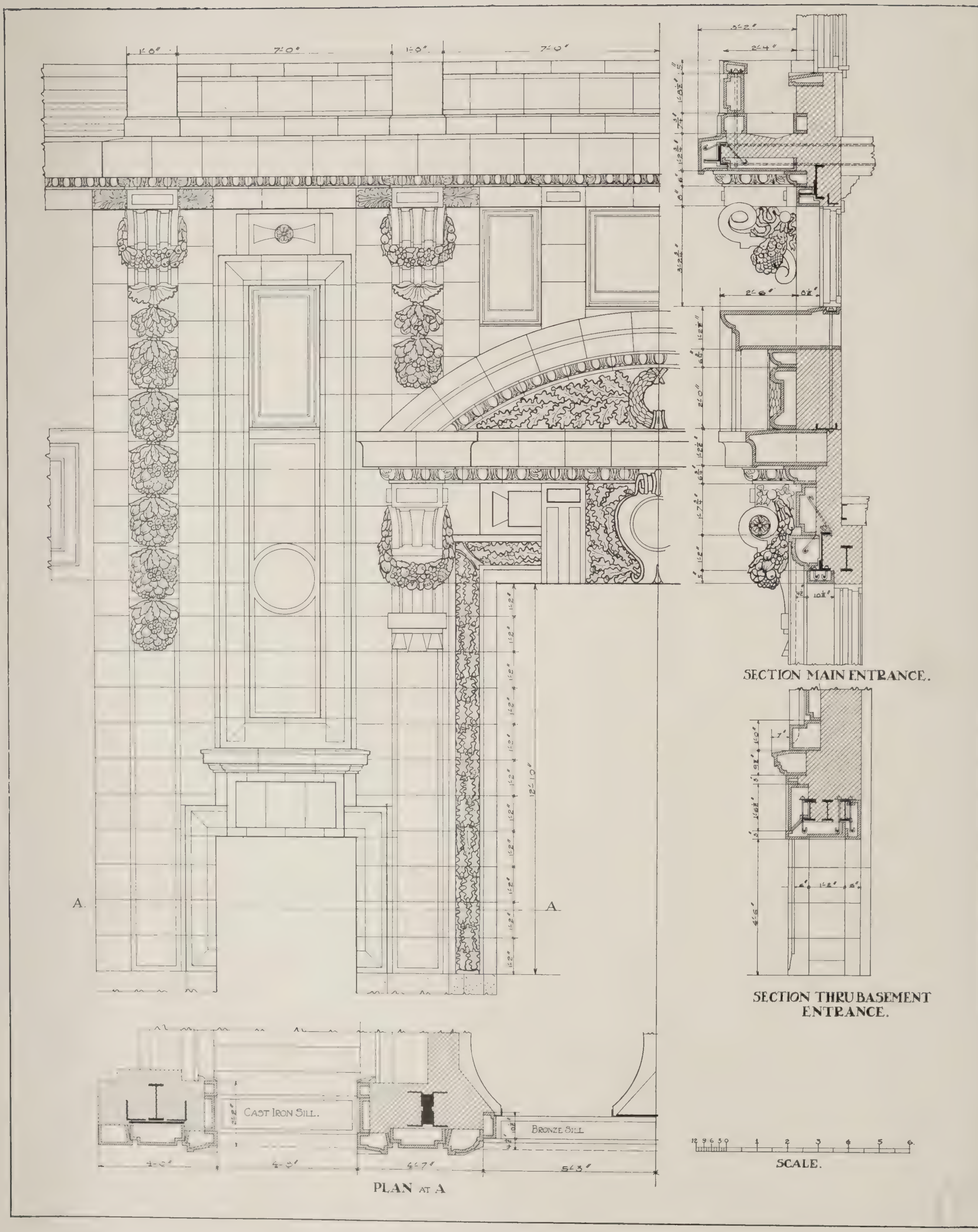
Work executed by the St. Louis Terra Cotta Co.



TERRA COTTA DETAILS, SEVENTEENTH STREET REALTY CO. BUILDING, ST. LOUIS, MO.

Albert B. Groves, Architect.

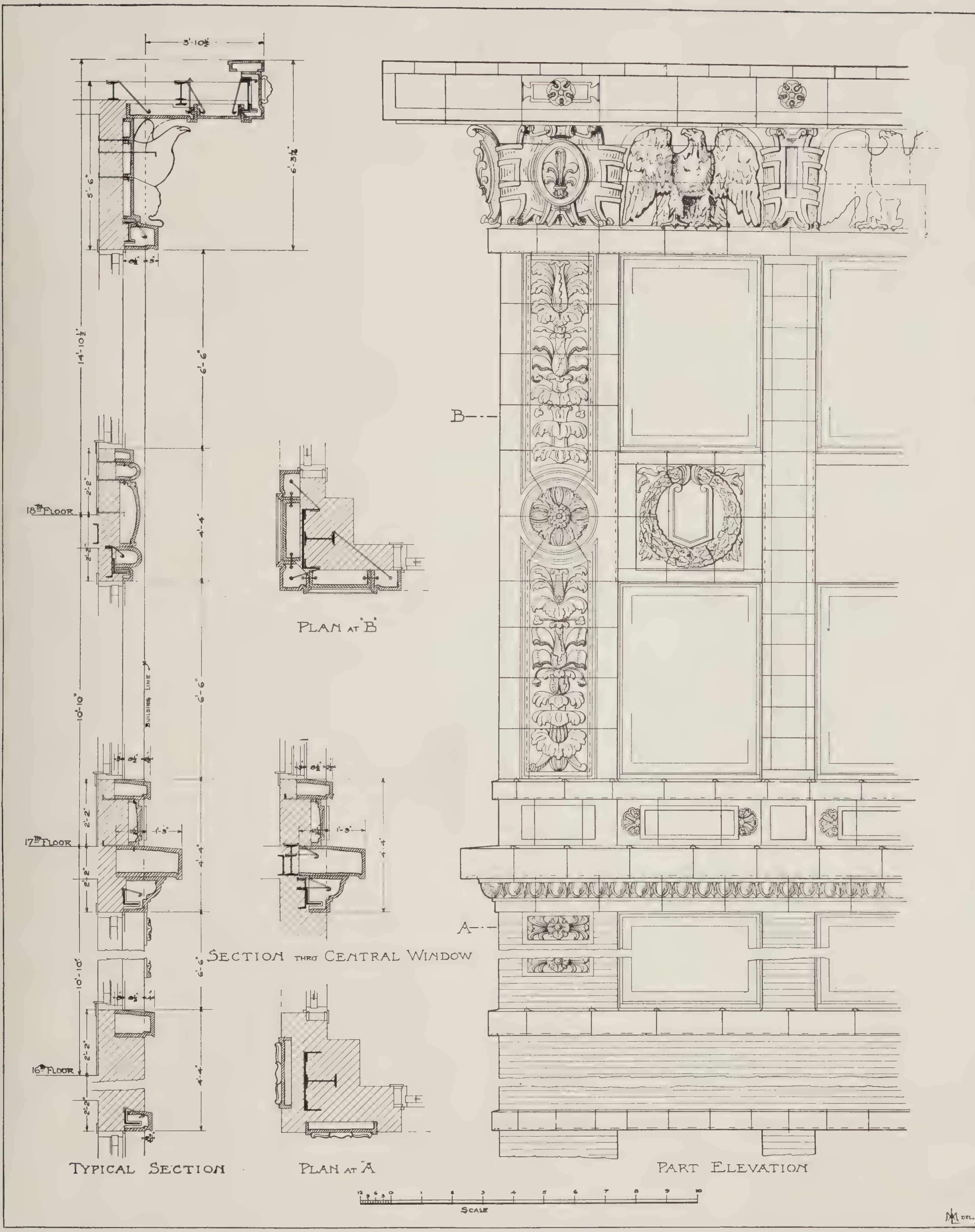
Work executed by the St. Louis Terra Cotta Co.



TERRA COTTA DETAILS, THIRD NATIONAL BANK, ST. LOUIS, MO.

Eames & Young, Architects.

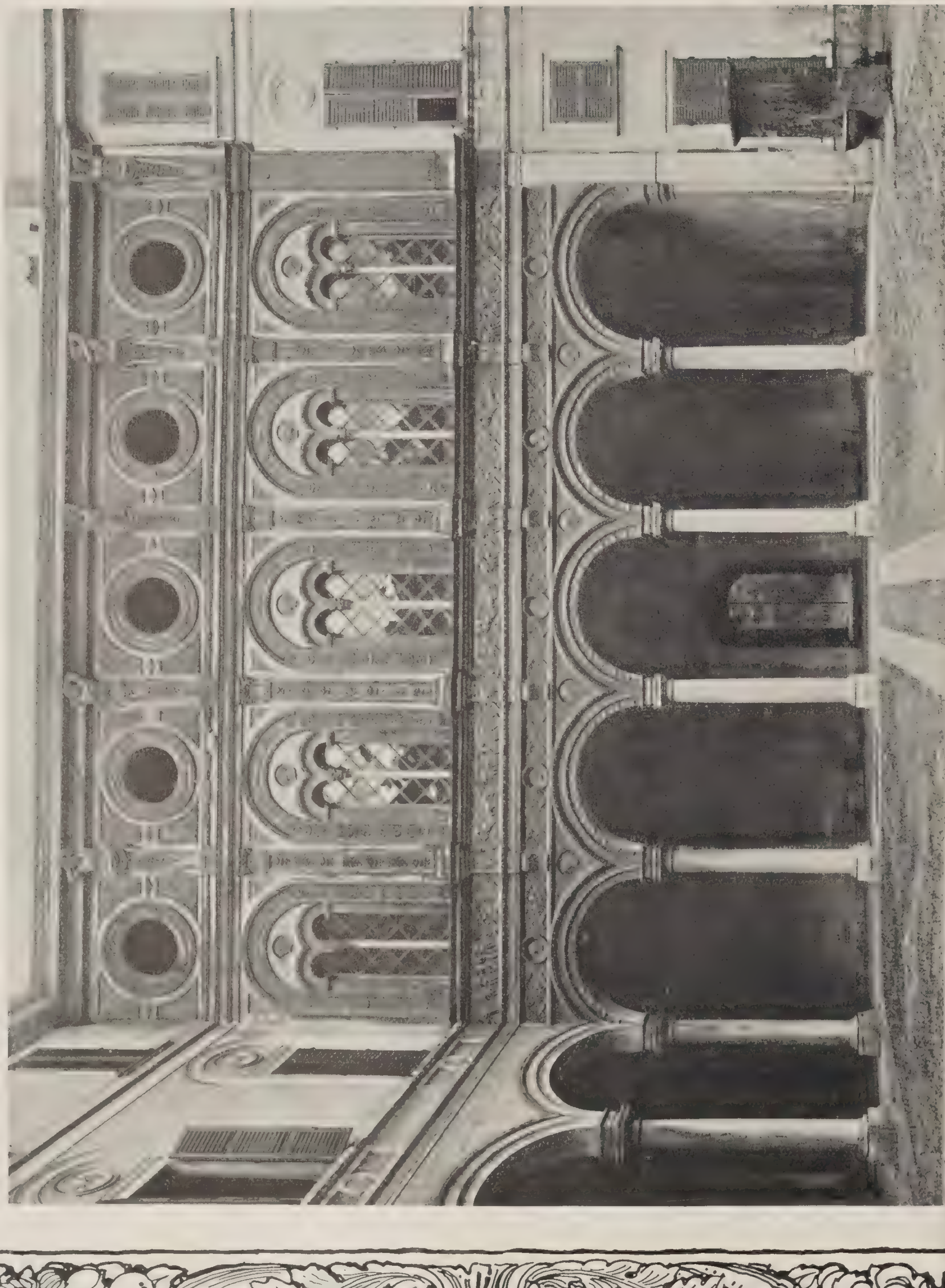
Work executed by the Winkle Terra Cotta Co.



TERRA COTTA DETAILS, THIRD NATIONAL BANK, ST. LOUIS, MO.

Eames & Young, Architects.

Work executed by the Winkle Terra Cotta Co.



Court of Palazzo Stagna, Cremona, Italy

Architectural Terra Cotta

By A. DURAND

ARCHITECTURAL TERRA COTTA is in no sense an innovation in the building world; in fact it was not a new material four thousand years ago. The Assyrians, Egyptians, Spaniards and Italians have all left examples which not only show that it has been in use, with certain lapses, since the very earliest times, but which also attest its durability beyond all doubt. The oldest records of mankind now extant were made in what is practically terra cotta, a mixture of sand and clay burned either in a rude oven or in an open fire; and clay pottery made in the same way antedates the iron age chronologically.

The structural use of terra cotta in early times, however, was far more limited in scope than to-day. It was impossible to attain the efficiency reached through present day methods, for the advance of terra cotta has always been dependent upon the improvement in methods of manufacture.

Progress has been more or less retarded by the fact that until recent years the demand for a material such as architectural terra cotta was not imperative. Wood and stone lay ready to hand, and were sufficient for all needs. When the fire danger caused legislation against the use of wood in metropolitan building districts, and when stone became more expensive, a very great impetus was given architectural terra cotta. And yet thirty-three years ago it was regarded as an untried material, and was used with conservatism. It proved admirably adapted for the existing conditions, and practically a necessity in the erection of skyscrapers, and its progress was steady, consistent and logical. So, in what now seems a crude form, dependent as it was for color upon the natural tones of burnt clay, architectural terra cotta became recognized among the standard building materials.

At first it was used almost exclusively for the ornamental members of a building, a use for which its pliant adaptability to modeling made it most suitable; and as it was so evidently a burnt clay material, its most harmonious and most general use was in connection with different shades of brick. Architects were quick to see the possibilities of obtaining ornamental designs in almost any style in a permanent form, and at a reasonable cost, by combining the two burnt clay materials. It was only natural that with such freedom many mistakes should be made, and it is rather remarkable that important errors should be so few. Fortunately the best architects were the first to take up terra cotta, and in a way they dominated its use.

The Madison Square Garden has always exemplified a thoroughly appropriate use of terra cotta in its early stage of development. Since the erection of this building great mechanical improvement has been effected in the body or clay mixture which constitutes terra cotta. While the early examples were strong enough to stand any necessary compression, they were composed largely of clays very liable to warp, especially in the case of large pieces. Extensive experiments were made to determine the kind of clays best suited to burn straight and at the same time to bind the body closely together, and terra cotta began to be used in a more independent way. Instead of being seen only in ornamental features of buildings, plain surfaces began to appear, generally at some distance from the ground, and frequently bearing the weight of several superimposed stories. Gradually, with improved mechanical accuracy, its scope broadened more and more. Entrances with intricate modeled ornament had already been successfully made, and now entire lower stories, that compare favorably with stone in appearance, are being erected in terra cotta.

The San Francisco and Baltimore fires which showed so conclusively the superiority of

architectural terra cotta over all other materials as a protection against fire, added new impetus to its development. In the reconstruction of San Francisco, terra cotta was largely used in connection with reinforced concrete. In some instances purely for its decorative possibilities, to relieve too dull a facade, but frequently as a complete veneer for both architectural appearance and fire protection.

At about the same time its polychrome potentiality came prominently to the front. Thus it challenged attention as a thoroughly practical structural material, and as one that in possibilities of form and color opened up the broadest field possible for architectural expression.

It now seems strange that during the period which may be termed the "regeneration of terra cotta," it was some years before other color was attempted than the natural clay colors, or what might be obtained by spraying the material before burning with a simple clay mixture. The art of making glazed colors, such as the della Robbias employed, was lost. A few tentative glazes were tried, imperfect, decidedly crude at best, and largely composed of lead, which gave the appearance of enameled paint poorly applied. But in this direction, as in the development of terra cotta itself, the progressive movement continued and steadily improved. A future where varied colors would play an important part in architectural terra cotta began to be dimly foreseen. Men trained in Ceramic Chemistry were employed, but beyond a few fundamental principles, they had no knowledge that could be directly applied. Through their experiments advance became more rapid, and it was not very long before a fairly satisfactory bright white glaze was evolved. For some years bright glaze was made with varying success by different companies, and was used extensively as a basis for experiments in color. By adding certain metallic pigments, various colors could be produced, but on the whole results were unsatisfactory. Slight variations in temperature and other kiln conditions not under entire control, would so affect the glaze that a great deal of material was ruined. All glazes had a bright surface, and when matt glaze was desired the terra cotta was sand-blasted. While this softened the tone it also rendered the material pervious to moisture, and the color liable to weathering changes and the accumulation of dirt, especially in smoky localities. The dull matt glaze now in general use, which obviates all these disadvantages, is a comparatively recent product, and has done more for the development and the increasing use of terra cotta than any other discovery. It is less susceptible to kiln conditions, and at present almost any color can be produced with a smooth soft texture that is absolutely unaffected in any climate, and therefore the accumulated dust can be easily removed with soap and water.

Fortunately again for architectural terra cotta, polychrome was first adopted by the leading architects, with great conservatism. Realizing the possibilities, they had also a full appreciation of the dangers of too extravagant a use of color. There was more than mere harmony to consider. The relation of various colors to various styles of ornament required careful study, and the effect of colors in perspective on a tall building from a viewpoint on the sidewalk needed careful thought.

The first example of prominence was Dr. Parkhurst's Madison Square Church, erected before the development of the matt glaze. In the light of more recent examples the moderation exercised seems a little excessive. The colors were far from bold, very moderately used, partly obscured by modeling, and made susceptible by sand-blasting to the softening influence of weather exposure. Nevertheless, the experiment was a marked success and excited wide and favorable comment. Other buildings in polychrome soon followed, and with the example of the Madison Square Church to go by, colors were used with less conservatism. It became apparent that, especially in high buildings, color could be used in strong tones and in rather large areas, with very good success. There is something about ceramic colors, probably due to their softness of texture — which permits shades, which might clash in another material, to harmonize very pleasantly in terra cotta.

The scheme of gradually increasing the strength of the colors as the distance from the ground increased has been widely used with entire success. Frequently, when the tone of the building was light and the treatment graceful rather than massive, the stronger colors have been used to supplement the natural shadows of the ornament, and thus emphasize the modeling, rather than to add their own color value.

The mechanical development, combined with the development of new colors and the improved quality of the glazes, opened up another field for the use of terra cotta. Here was a material, practical, absolutely fire and weatherproof, capable of being modeled in any form, and treated in any color or combination of colors, permanently durable in every respect — and all at a comparatively low cost. Soon buildings of size constructed entirely of terra cotta, appeared. Many modern skyscrapers and apartment houses of the better class are examples of its exclusive use.

The most interesting development, however, has been along the line of polychrome, and the color possibilities place terra cotta distinctively in a class by itself. It is the only material in which various colors can be obtained on the same piece in a permanently enduring form that will keep bright and clean practically forever. It has been used several years now to supplement formal and conventional modeled ornament, but its use in entirely original figure work is of more recent date.

Another development in architectural terra cotta, directly due to the polychrome possibilities, is its use for interior decoration. Along this line, too, its progress was slow and conservative. The practical sanitary qualities of the bright glaze were partly responsible for the inception of this development. In large concourses, such as the Hudson Terminals in New York, a bright glaze is often used, enlivened with a frieze course paneled in yellow or some other color. The sanitary advantage of a non-absorbent material that is easily washed is apparent.

For the same reason polychrome has been used in several instances for the decoration of swimming pools and natatoriums. It will be readily seen that the bright glaze is admirably suited for this purpose.

In a general consideration of architectural terra cotta to-day, it is rather surprising to find that while it is recognized as a standard building material in some localities, particularly in metropolitan districts, and very extensively used, in other localities it is practically unknown. In view of its potential and actual importance, it is no less than astounding to realize that there are architects who have practically no knowledge of its qualities. This condition is partly accounted for by the fact that no architectural schools deal with the subject to any extent, and that, while its growth has been logical, it has developed more rapidly in the past few years than at any other period in its history. Another reason which may account to some extent for the lack of a more general appreciation, is that some architects may have tried it once with poor success ten or fifteen years ago (for undoubtedly there has been poor terra cotta on the market), condemned its use without appeal, and taken no notice of its further advance. And yet the steady growth of terra cotta is its own argument in refutation of any such charge; and there is no doubt that in the near future every architect will recognize architectural terra cotta for what it is.

And briefly this is what it is: —a practical structural material, absolutely unaffected by fire in even a general conflagration (because in the process of manufacture it is burned at a temperature approximating 2300° Fahrenheit); capable of bearing any necessary compression, when supplemented by proper filling and frame construction; unaffected by weather, because it is either absolutely impervious, or so nearly so that the effect is negligible; it may be used independently, or in connection with any other building material. It is a decorative structural material: — every piece is made especially to occupy a certain place in a certain building, thus enabling the architect to design according to his own ideas, hampered only by the few natural limitations of terra cotta. It is also an æsthetic structural material, lending itself readily to modeling in any form, and susceptible to treatment in any one or any combination of a great number of different colors.

Atlantic Terra Cotta Company, Plant 2, 1879

(Originally the Perth Amboy Terra Cotta Company)

Atlantic Terra Cotta Company

1170 Broadway, N. Y.

A comparison of the two illustrations of the Atlantic Company's Perth Amboy plant gives some idea of the development and increased use of Architectural Terra Cotta in the past thirty-two years.

Through its Perth Amboy factory the Atlantic Company was first in the field in this country, and has consistently set the standard of highest quality through all the development of Architectural Terra Cotta.

The Atlantic Terra Cotta Company owns the following plants: Plant 1, Tottenville, N. Y. (the original Atlantic Terra Cotta Company); Plant 2, Perth Amboy, N. J. (the original Perth Amboy Terra Cotta Company); Plant 3, Rocky Hill, N. J. (the original Excelsior Terra Cotta Company); Plant 4, Perth Amboy, N. J. (the original Standard Terra Cotta Works); and a Southern Branch, the Atlanta Terra Cotta Company, at East Point, Ga. (six miles from Atlanta).

The Atlantic Company has executed every polychromatic work of importance in the country. The fact that work of this character is executed at Perth Amboy makes the Perth Amboy factory the most interesting as well as the largest of its kind in the world.

Architects wishing to visit the Atlantic factories may obtain passes upon application to the New York office, 1170 Broadway. Perth Amboy is a fifty minute trip from New York.

Atlantic Terra Cotta Company, Plant 2, 1910

Capital for State Educational Building, Albany, N. Y.

Palmer & Hornbostel, Architects

Finishing the model in one of the Atlantic Company's Studios

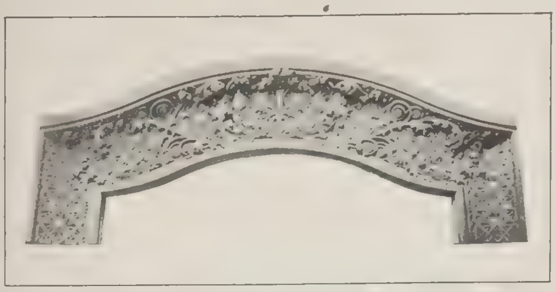
Twenty-eight free column capitals, twenty-eight engaged column capitals and four pilaster capitals, eight feet in height, together with all the ornamented features on the State Educational Building, were made in cream matt glaze Atlantic Terra Cotta, in harmony with the marble of the simpler members. The cost of one full capital in marble would have been $2,400 by actual estimate; the cost in Atlantic Terra Cotta was $400.

The ceiling of the colonnade is in Atlantic Polychrome, light blue and two shades of cream.

The use of Atlantic Terra Cotta throughout for ornamental work resulted in a saving of $500,000. The cost of the Architectural Terra Cotta was one-fifth of this amount.

Atlantic Terra Cotta Company

1170 Broadway, N. Y.



ENTRANCE • GANSBERGEN APARTMENTS • CHICAGO • PERKINS & HAMILTON, ARCHTS

PANEL IN SPANDREL • 2ND NAT. BANK, RICHMOND, IND, A. PRETZINGER, ARCHT.

THE AMERICAN

PANEL IN FRIEZE • GOLDEN RULE BLDG
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TERRA COTTA
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CHICAGO, ILLINOIS.

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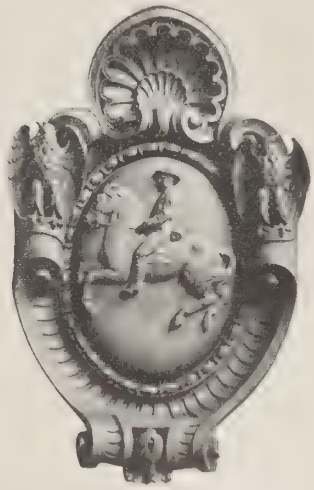
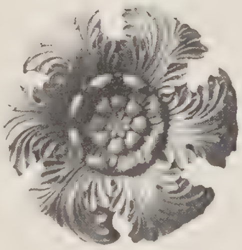




SECURITY BUILDING
LOS ANGELES, CAL.
PARKINSON & BERGSTROM
Architects

COLUMBIA THEATER
SAN FRANCISCO, CAL.
BLISS & FAVILLE
Architects

MET. LIFE INS. BLDG.
SAN FRANCISCO, CAL.
N. LEBRUN & SONS and J. R. MILLER
Architects

HAMBURGER BUILDING
LOS ANGELES, CAL.
A. F. ROSENHEIM
Architect

OLD NATIONAL BANK BLDG.
SPOKANE, WASH.
D. H. BURNHAM & CO., Architects

Gladding, McBean & Co.

CROCKER BUILDING

San Francisco - - California

YEON BUILDING
PORTLAND, ORE.
REID BROS., Architects, San Francisco

LOS ANGELES TRUST BLDG.
LOS ANGELES, CAL.
PARKINSON & BERGSTROM, Architects

MANUFACTURERS OF

ARCHITECTURAL TERRA COTTA

NEWHALL BUILDING
SAN FRANCISCO, CAL.
LEWIS P. HOBART, Architect

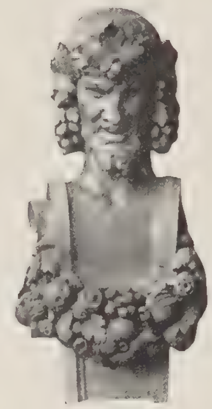
PARTIAL VIEW OF WORKS, LINCOLN, CAL.

Entire Front of Terra Cotta
D. A. Bohlen & Son, Architects

Entire Front of Terra Cotta
D. A. Bohlen & Son, Architects

Y. W. C. A. Building, Indianapolis
D. A. Bohlen & Son, Architects

Y. M. C. A. Building, Indianapolis
Foltz & Parker, Architects



HOTEL VANDERBILT

Park Avenue and
33d and 34th Streets

NEW YORK

Warren & Wetmore, Architects

And a few details of the Architectural Terra Cotta, all of which were furnished by us in polychrome colors

The New Jersey Terra Cotta Co.

Singer Building

New York, N.Y.

Factory
Perth Amboy, N.J.

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We manufacture Architectural Terra Cotta in all colors and shades — enameled, glazed, semi-glazed, non-absorbent limestone and polychrome.

Being one of the oldest and largest Terra Cotta manufacturers in the east, we have the experience and facility for producing the highest grade of material in the shortest possible time.

Drawings and specifications sent us for estimating will be promptly returned with our bid.

Terra Cotta manufactured and set by The Northwestern Terra Cotta Co. in 1884

THE PEOPLES GASLIGHT AND COKE CO. BLDG.
CHICAGO, ILL.
D. H. Burnham & Co., Architects
Granite Terra Cotta from fourth story sill to sky line

Terra Cotta Manufactured by

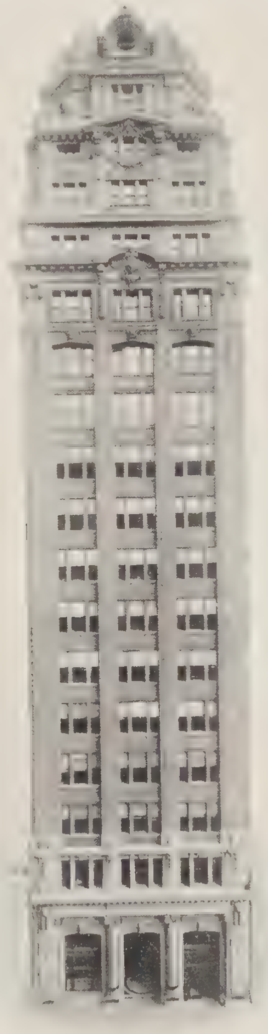
THE NORTHWESTERN TERRA COTTA CO. CHICAGO, ILL.

THIS building represents the first Architectural Terra Cotta contract let in San Francisco after the great conflagration. But few persons of the millions who have seen this imposing structure know that from the third story window sills to the top of the dome all of the exterior is Terra Cotta made in imitation of gray sandstone. Many of the architects of San Francisco are still under the impression that it is stone and almost incredulous when shown their error.

As may be plainly seen the sandstone in the first two stories is fading while the Terra Cotta is as fresh and fast in color as the day it came from the kilns.

To architects who may still be skeptical as to the superiority of Terra Cotta and brick over stone we say "Look at three of our buildings which went through the fire and stand to-day as permanent monuments to the indestructible qualities of impervious pressed brick and Terra Cotta.

"They are the
Rialto
Monadnock
Grant
all faced with products of our own manufacture."



Humboldt Bank Building
Market St., San Francisco
Meyer and O'Brien, Architects

For samples of our impervious Gobelin brick and unequaled Reds, as well as specimens of our enameled and standard finished Terra Cotta for both exterior and interior effects, we invite your correspondence.

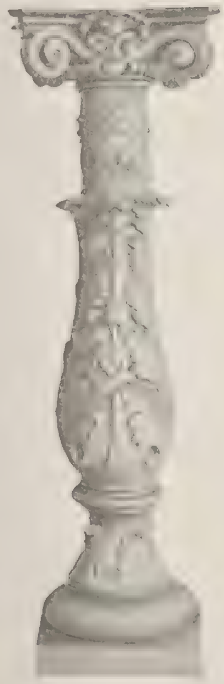
Steiger Terra Cotta and Pottery Works

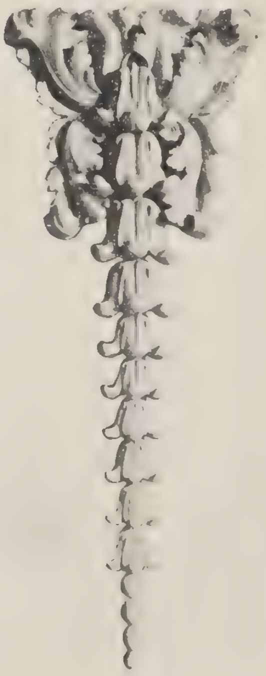
Manufacturers

Architectural Terra Cotta and Pressed Brick

Factory: South San Francisco Office: Mills Building, San Francisco








THE BRICKBUILDER

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LETTERPRESS

JOHN MERVEN CARRÈRE

THE BRICKBUILDER

VOL. XX. NO. 3. MARCH, 1911.

John Merven Carrère

IT IS only when such a commanding figure as John M. Carrère has passed out of his profession that its members are brought to a realization of what he stood for and what a position he had achieved. When we consider what was still before him in the natural course of his career, our regret at his untimely end is intensified.

I first knew Carrère when he and his future partner Hastings came into the office of McKim, Mead & White on their return from the Beaux Arts in October, 1883. He remained with us for two years as one of a group of young draftsmen, many of whom have since achieved distinction. Carrère, with his Gallic nature, was full of enthusiasm and ambition — not the ambition to remain a draftsman, but to get out into the world as the master of his own work. The opportunity came early in the commission from Mr. Flagler for the Ponce de Leon Hotel at St. Augustine, and the consequent formation of the firm of Carrère & Hastings. The opportunity seemed to me a dangerous one for men just starting in their profession; but the result stands to-day as a justification of the confidence reposed in them.

I need not say anything of his career since that time — it is an open book, known to all. I had always kept up intimate personal relations with him and watched with interest his gradual development, not only as an architect, but as a man of influence. If, apart from his architectural work I should single out one trait of his character which more than any other impressed itself upon me, it would be the valuable services which he has rendered to his profession by his work and untiring energy in anything and everything which would advance its standing. He showed his public spirit by the large part which he took in problems of civic improvement, both in his home city and elsewhere throughout the country. As a member and officer of the American Institute of Architects and of the New York Chapter of the A. I. A., as a founder and important factor in the Beaux Arts Society and as a Trustee of the American Academy in Rome, he was ever ready to work for these institutions and always found time to devote to them. His work was always full of enthusiasm and his judgment was invaluable. My last interview with Carrère was only two days before the accident, when in the midst of all his arrangements for getting away, he found time to call upon me to discuss his visit to Rome and what he might be able to do for the American Academy while there — showing once more his devotion to everything which tended to the advancement of art education.

In the death of Carrère the profession of architecture has lost a member whose place cannot be filled.

William Rutherford Mead.

IT IS now nearly thirty-five years since I first met John Carrère. It was on one of the steamers crossing the Atlantic to New York; I was returning from the École des Beaux-Arts where I had been for several years, and he was on the point of going abroad to study architecture. This almost casual acquaintance was destined to ripen into a long and firm friendship. We had naturally much to say to each other; he was undecided where he should go to pursue his studies, and I naturally advised Paris — and to Paris he went; and that is why, as I am fond of remembering, he used smilingly to speak of me as his architectural godfather.

When he came back from Paris six or seven years later, we renewed our acquaintance; and it is a great pleasure for me to think that during all the years that followed we became ever closer friends, and that we learned mutually to turn to each other for counsel, for advice and for sympathy in all our architectural career. I recall many visits when Carrère & Hastings, the youngest of the profession, were designing the hotel in St. Augustine, and the impression of individuality and personality that I had then of the work that the enthusiastic pair were doing. And this individual force was always one of the characteristics of Carrère; however large was the army of draftsmen that he commanded, you were always conscious of his personality in whatever was done, directing, restraining and guiding. He was always first and foremost the architect; and never a mere solicitor of work, or a social light who incidentally built houses for his friends.

This is no place to attempt any description or criticism of the many notable achievements with which he was so closely identified, and which all of us architects know so well. We note in them from time to time those changes in the point of view which come from increasing years and added experience, and which are common to nearly every one of us. But through it all is still to be found the same personal note, however varied in its expression; so that when a number of competitive drawings were exhibited it was generally quite possible to make a shrewd guess as to which one was by Carrère & Hastings. And in whatever Carrère had a hand, there was nearly always a great impression of completeness in the idea; if it were a country house, the setting and the surroundings were studied as carefully as the house itself, and the same was true of more monumental structures.

Carrère never forgot that he was a member of a great profession, and of his time and his thought he contributed much for its good and its advancement. The American Institute of Architects is deeply indebted to him for his active initiative and his sound advice in many emergencies; and he will be missed in many other bodies where he was a strength and a dependence. But above all he will be missed by his many friends, in and out of the profession, who looked to him for aid and for sympathy whenever the need arose. It is a great sadness to think that he can never drop in on us again, with that buoyant manner, that enthusiasm and that sincere and friendly smile that we knew so well.

Walter Cook.

An Early Example of the Use of Terra Cotta in America.

THE old Art Museum, Copley Square, Boston, which has been torn down to be replaced by a large modern hotel was in many respects an interesting building — and marked a new departure in the use of materials in America.

Mr. John H. Sturgis, of the firm of Sturgis & Brigham, the architects for the building had received much of his architectural education in English offices, amongst others that of J. K. Colling, who had published the work known as Collings Art Foliage. That work was an attempt, more or less successful, to adopt naturalistic leafage — flowers, etc., and modern detail in the manner of English Gothic, such as is to be found in Lincoln Cathedral. It was rather the aftermath of the early Victorian Gothic revival, and the designs had the rather geometric characteristics of certain types of English stone carving, which was broad but effective. These designs as used by Mr. Colling were employed not only for the interstices of structure, such as spandrels, tympana, roundels and foils, but also somewhat indiscriminately for the surfaces of walls and of columns. The result was an effect of richness and texture obtained with economy of labor.

But even this amount of labor was prohibitory with the funds at hand for the museum and the experiment was made (a brave experiment in our climate) to obtain the effect in a less expensive material than carved stone, i.e., terra cotta. The result was that the details while made for terra cotta partook of the character of stone carving, and had less of the plastic quality of modeling than appears in the terra cotta of Northern Italy. The details for the terra cotta, while designed in the office of Sturgis & Brigham, were redrawn to a scale of 13 inches to the foot to allow for the shrinkage in the material, which was made in Stoke-on-Trent, England, as the terra cotta industry was at that time in its infancy in this country. Before the final work, that of the porch, could be completed, the English Company met with reverses, and the terra cotta of the porch was made in New Jersey, and was amongst the first of American ornamental terra cotta.

ART MUSEUM, COPLEY SQUARE, BOSTON.
(Recently demolished.)

While the best English made terra cotta has never been allowed to be as good as that now being made in the United States it is nevertheless true that the decorative panels — one of which is shown in the illustration — have successfully withstood the test of time and a rigorous New England climate and are to be given a permanent abiding place in the Boston Art Museum.

The façade while picturesque from the characteristics of the style in which gables, pinnacles and finials were employed, was simple and symmetrical in its masses and well proportioned, and, facing the north so that it obtained little direct sunlight, was all the more effective because of its contrasts of color — both yellow and red terra cotta being used. The large panels upon the front were by Bartholdi, the sculptor of the Lion of Belfort, and of the Liberty in New York harbor.

The museum always suffered from its proximity to the Public Library and Trinity Church — both of which were larger in scale. It was of the class of design which gains by a certain amount of isolation with terraces or parked grounds about it. It is to be regretted that the changes in civic growth should have necessitated its demolition.

The Presentation of PRELIMINARY STUDIES of Architectural Subjects

III.

BY HUBERT G. RIPLEY.

"A sense of humor as intelligently applied to the eccentricities of architecture is one of the last products of high civilization." — "*L. P.*," *Boston Transcript.*

THE most satisfactory preliminary drawings are those that are made after the building is all done. In a sketch of this kind it is possible to take advantage of natural bits of scenery, composition and lighting, at the same time suppressing unflattering details, adding foliage, planting, and accessories, and presenting the whole subject in its most favorable aspect.

It is frequently claimed that the ideal surroundings in the preliminary sketch give an exaggerated and false impression of the finished work, but in making the preliminary sketch after the building is all done, there is an opportunity to suggest not only ideal settings, but actual possibilities which might often be realized at trifling expense and labor.

Suppose your client has insisted on retaining some objectionable feature that mars the harmony of the composition, or that an otherwise perfect interior is spoiled by an ugly and glaring piece of amorphous furniture, or spot of color way off the key; here is a chance to show by illustration and comparison how the improvements and changes would look; and should the client remain insensible to their charm, you have at least an ideal presentation of your work that is invaluable for future use.

What preliminary sketch, for instance, could equal Bougerel's charming drawing of the temple of Andronicus Cyrrhestes, and, had his series of wonderful drawings of classical subjects appeared in a more appreciative age, would not the council of the Amphictyons have honored him as they honored Polygnotus, or Alexander honored Lysippus for his Apoxyomenos?

A better handling of his subject, or a more refined and restrained mastery of his medium than Bougerel displays, cannot be imagined; and yet all these drawings were made long after the buildings they illustrate were completed.

The architectural exhibitions, which form the chief winter indoor sport of the architects and draftsmen in our larger cities, usually contain several examples of the preliminary sketch made after the building is done; and in recent years, this form of amusement seems to be increasing. Some of the best things shown in these exhibitions are produced by glazing over enlargements of photographs taken from a carefully chosen point of view. These sun-prints may be made on good paper suitable for water color, and with a judicious use of body color for the foreground, taking advantage of accidental effects where intricate detail shows through a light glaze, an appearance of almost abnormal ability in draftsmanship is obtained. The aim should be to produce a drawing that bears little or no resemblance to a colored photograph, and this result is not hard to obtain if a little skill and "chic chic" is bestowed on some part that has no special relation to the building, such as the introduction of overhanging foliage, clipped ilexes, or Phylakian amphoræ. A well composed group of figures and a large touring car racing madly up the street complete the illusion.

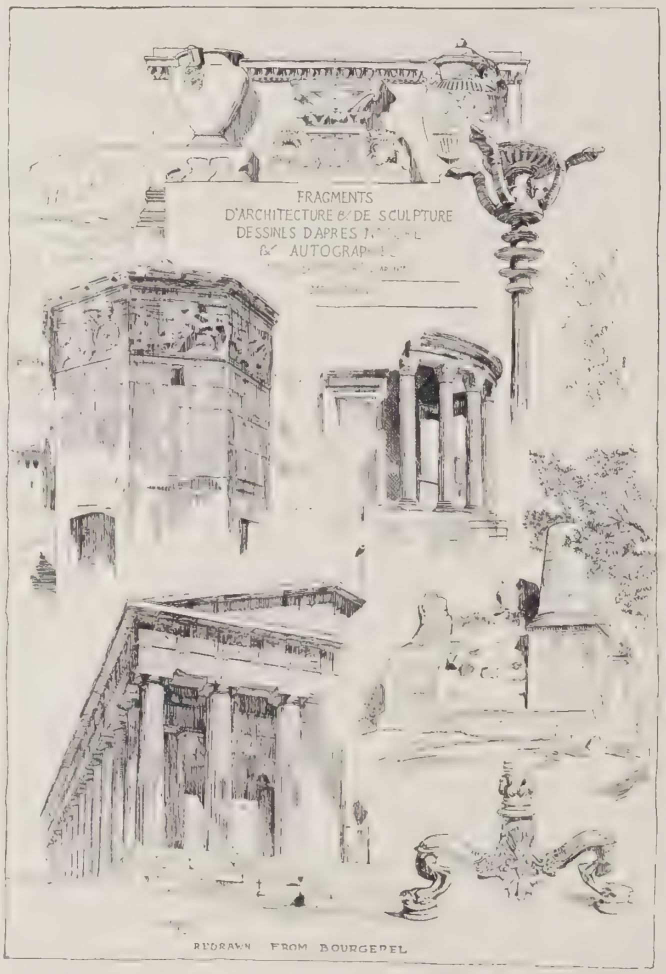


FIG. X.

A group of Bougerel's sketches redrawn to show how appropriate for architectural illustration is this little-used style of rendering. A close study of Mr. B's book will amply repay old and young in its revelation of the value and purity of line, extending through an exhaustive series of drawings without one cacophonous note.

It might be well to pause for a moment and summarize some of the better known methods for the presentation of sketches. This summary does not comprise all the inloidean secrets of the guild as the limits of these articles forbid an exhaustive treatment of the subject. The following list, however, will be found sufficient for ordinary purposes:

I. Pencil drawings on tracing paper from which prints may be made and rendered.

II. Pencil tracings rendered and mounted on cardboard and slightly tinted.

III. Pen and ink drawings, sometimes made on bristolboard or Whatman's paper, and sometimes made on tracing paper over rough sketches and printed in a black or brown line.

IV. Water color drawings, fifty-seven varieties, from those made with a few strokes of the brush to the elaborately studied "rendu."

V. "Calques" transferred to heavier paper or cardboard and rendered in a thousand and one different ways.

VI. Monotones including semi-monotones and demi-monotones.

VII. Rendered solar prints and salt prints and all sketches which use photography as a base.

As there have never been but the seven original Greek jokes and all subsequent jokes are merely variations of some well known theme, so there are only seven different ways of rendering drawings. There are, however, innumerable combinations resulting from the amalgamation, either in whole or part, of one or more of the above methods; but it is well to always bear in mind that the artless way is apt to be the best, and that the most forcible result is obtained by the drawing that, at least, looks unlabored, clean, and fresh; though a great deal of thought and time may have gone into its making.

A sketch may be studied and re-studied, fussed over and cussed at, rubbed out and re-drawn until its author has mental cirrhosis; then when reason begins to totter on her throne, spread the healing poultice of a fresh sheet of white tracing paper over this chyme, and new life will be injected into the exhausted brain muscles by its revelation of unsuspected possibilities, and the easy, natural result that nature intended will arrive.

The more elaboration there is in a sketch or drawing, the more rendering detail and finesse that is attempted, the more knowledge and skill its author must possess; for it is never safe to try to cover up defects by intricate and bedizened embellishments. The defects only appear the more glaring. Let the budding young Hornbostel tread the straight and narrow path for a while, following the footsteps of the early masters before he tries to scale the heights of Parnassus.

After even a small experience in drawing, say a year or two of study, the neophite is familiar with the well

known "forms of use, structure, and expression," as one might say, and he should be able to draw these forms from various points of view. The most natural and graphic portrayal is in perspective, and every draftsman should practice at odd moments, at home, on the train, in the office when the boss is not looking, at any and all times; little thumb-nail sketches in perspective of Doric, Ionic and Corinthian caps, cornices with brackets, doorways, windows, niches, balustrades, swags, cornucopiæ, anything that comes into his hand in any and all mediums; not forgetting the august cartouche. Copies should be made of bits here and there culled from the best sketches published in the magazines, studying the technique of the various virtuosos; now attempting Mr. Gregg's trees in pencil and trying to draw his foregrounds; (you won't be able to do it for nobody can do it just like that but Mr. Gregg himself) now copying, as well as you can, some exquisite detail in pen and ink of Mr. Goodhue's. Try also a sketch in color following as closely as possible Guerin or Birch Long, whose sketches are familiar through numerous reproductions, and whose masterly handling of architectural subjects with all their accessories has a sure and distinctive touch that proclaims them the last word, and withal, a simplicity and directness that breathes of asphodel and amaracus.

FIG. XI.

Sketch for a commercial warehouse building, Andrews, Jaques & Rantoul, architects. The first drawing, made on water-color paper, showing the building in full sunlight, was somewhat turgid, so this drawing was traced over it, mounted on cardboard, and then washed in, in deep, full washes, using plenty of color and a flowing brush. The method illustrates the flexibility of the "calque" and shows how a brilliant result may sometimes develop from a jejune paradigm.

The first essays, the second and the third, and the twenty-third, will be failures. It is not so easy to lay a satisfactory wash as it is to pull the leg off a sawdust doll; but if one out of fifty sketches are really presentable, distinct progress is being made, and, eventually an individuality of style will develop that will at least be worth all the pains and labor to say nothing of the fun you will have in the trying.

It is to be noted that those, who by their agility and skill are able to dazzle and bewilder with the brilliancy of their technique, are most often contented with presenting their drawings in a simple restrained fashion.

In addition to, or possibly subtraction from, its artistic quality, a drawing or sketch of an architectural subject must express primarily form; and, unless the delineator is thoroughly grounded on form, and knows what he is drawing, and how it looks from every point of view inside and out, plan elevation and section, structure, mass, texture and material, no amount of cleverly contrived extraenous matter can hide its defects from the practiced eye; though the sketch may, nevertheless, serve its purpose perfectly by virtue of its sophistry.

FIG. XII.

Study for a church, Calvin Keissling, architect, rendered in pen and ink on "vellum" tracing paper. Several vandyke prints were struck off by the X-Ray Blue Print Company and this reproduction was selected as one of several essays in wash, using Bistre as a medium. In the original, this luscious and pellucid brown harmonizes charmingly with the color of the lines of the print.

This may or may not be so, circumstances are so variable, and time is so often the governing factor, that not one sketch in ten, or even a hundred, is the perfect expression, as it should be, of the idea of its author. Suppose in the case of an important commission the architect has his "partie" fairly well determined, the building committee are pacified, and all looks rosy for a quick settling of preliminaries, and the clearing of the decks for immediate action; some influential person on the committee desires a perspective, or the newspapers want one for publication. The time is short and the whole office is busily engaged on the working drawings; the boss wears a worried look and divides his time between his expensive stable of Paris graduates and the telephone, stopping now and then to interview the representative of the Chicago clothes' dryer, and the Diogenes report man; Madeline, the rosy cheeked stenographer, is pounding her pretty finger tips pink and getting carbon paper on her violet cuffs, when John, the office boy, with eagle eye on the clock, announces a guy with long hair, velvet coat, flowing tie and a bored expression.

Enter the perspective man, who forgets his bored look for a minute as Madeline's great round eyes look trustingly at him. He and the boss talk over the "scheme" for a few moments using such words as "partie," "rendu," "laver," "entourage," "nouage," "bosquet," "trottoirs," "niche," "tricher," etc., etc., and then they come down to brass tacks and a discussion of whether the drawing had better be in monotone, water color or line. The artist respectfully suggests that sunrise effects are very popular this spring and that "gouache"

FIG. XIII.

One of "Pete" White's dashing renderings in color over a positive brown print of a pencil drawing. Mr. White holds the amateur middle-weight championship for eastern Massachusetts in this line of work, and was one of the pioneers in developing the possibilities of the rendered print. They say that his blueprint bills sometimes average $40 a month.

FIG. XIV.

An example of rendering in wash and gouache over a solar print. Here and there the transparent limning allows the detail of the photograph to appear, and the drawing, by and large, may be described as a by-product of the aquarelle. The design shows a splendid impulse in the Alfalfa Renaissance.

is being used extensively, though for his part he thinks there is nothing like a delicate pen and ink or transparent water color, or even a crisp and "coulant" pencil sketch, if time is a factor. That brilliant and stirring Palladian motive in the top story with the "art nouveau" panel deserves to be "brought out" as forcibly as possible, and for the foreground he suggests a 1912 model fore door "landaulet," with a gentleman in frock coat leaning on a cane staring at a couple of coryphées, and a little boy selling a paper to a paralytic. The park and fountain with a "bosquet" of trees on one side and a thunderstorm coming up from the southwest, through which is seen a factory chimney way off on the horizon on the left, and a church spire on the right.

All this time the architect is wondering how much he is going to be stung for, and the perspective man is wondering how much of the architect's bank account he can annex without jeopardizing his future emoluments.

With a promise to have the drawing by Tuesday, and a sidelong look at Madeline, the artist departs, a roll of "calques" under his arm. On Tuesday the architect telephones and learns, that to do the subject justice, more time is required, and about Friday the finished drawing arrives. The artist stands anxiously and humbly on one foot, listening to the criticisms. Sometimes the boss gives the drawing a quick glance, says "humph," and retires into his private office; sometimes he looks for a long time without saying anything; often, very often, radical changes are suggested, and that little part right in there, that the artist was most proud of, must be washed or rubbed out, as it destroys the harmony of the composition, or disturbs the balance of the design. Then the trees should be simplified; they are too restless and need to be "pulled together"; the figures are badly composed, the automobile should be coming, not going; and the clouds are too heavy or too light; besides, the building is not the right color and the point of view is all wrong; it doesn't do the building justice or express the idea at all.

About four years afterward the perspective man visits the same office and sees that very drawing expensively framed and hung in a commanding position, and the architect greets him warmly and says, "That's the best drawing you ever made for us, old man, I bet you couldn't do as well as that now," and the artist says no he couldn't.

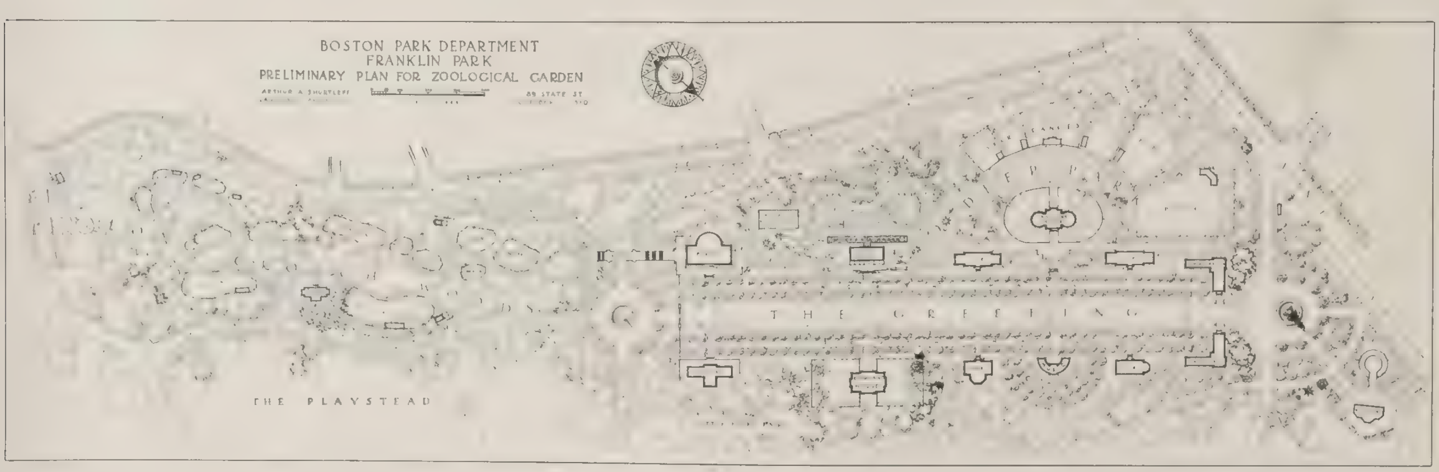


FIG. XV.

Showing that pen and ink as a medium is suitable for the presentation of plans as well as elevations, sections and perspectives. The conditions and surroundings are faithfully portrayed and the rendering could have been carried even further had it been essential.

The Manual Training High School.—III.

BY WILLIAM B. ITTNER.

EMERSON SCHOOL, GARY, INDIANA.

THE Emerson School is the first of a series of school buildings completed for the new Steel City. It is unique in the fact that it is designed to accommodate what is called a continuation, or all-day-long school, upon industrial lines. It is also a social center for the district in which it is located.

Although providing the equivalent of but two years of high school work it has a special problem to fulfil in the education of the mixed foreign element which makes up the majority of the population of the city.

The building has a dimension of 245 feet by 141 feet 9 inches, not including the boiler and fuel house which is located immediately to the rear of the building.

GROUND FLOOR. The ground floor contains six regular class rooms, two kindergarten rooms, and two library rooms each being the equivalent of a class room. There are also four manual training rooms with storerooms, etc., each room being the equivalent of two class rooms.

There are two gymnasia with lockers, wash and toilet room, each the size of two class rooms and opening upon a swimming pool with shower baths. All class rooms and workrooms on the ground floor are above the grade of the playground.

In addition there are two large locker rooms, one janitor storeroom, two general toilet and wash rooms, rooms for heating plant, boiler room, ash room, and a coal room which will hold one season's supply. The play-ground is 320 by 295 feet. On the ground floor is a corridor 16 by 180 feet which will be used for play during bad weather.

FIRST FLOOR. The first floor contains twelve regular class rooms, a principal's office, two teachers' rooms, a storeroom for the distribution of all school supplies, two large locker rooms, two general toilet and wash rooms, and the main floor of the auditorium. The auditorium seats five hundred and forty-six adults, and has a stage constructed in accordance with the fire ordinance of the city of Chicago.

MAIN ENTRANCE, EMERSON SCHOOL.

The large main corridor is planned and lighted for a School Art Gallery as well as for general hall purposes.

SECOND FLOOR. The second floor contains twelve regular class rooms, two manual training rooms the same size as class rooms, the gallery of the auditorium which seats two hundred and seventy-eight adults, two rooms for infirmaries, a conservatory for housing and propagating plants, and two general toilet and wash rooms. The large main corridor is used for a school museum.

THIRD FLOOR. The third floor contains a drawing room equal in size to two class rooms.

SUMMARY. The number of regular class rooms or equivalents in the building is as follows: Ground floor, twenty-four; first floor, twelve; second floor, fourteen; third floor, two —making a total of fifty-two. In addition to these there is an auditorium that will seat eight hundred and twenty-four adults, four locker rooms, six general toilet and wash rooms, two rooms for infirmaries, two teachers' rooms, office, and two storerooms. There are also large well lighted halls for an art gallery, school museum and a conservatory, besides the usual required space for general purposes.

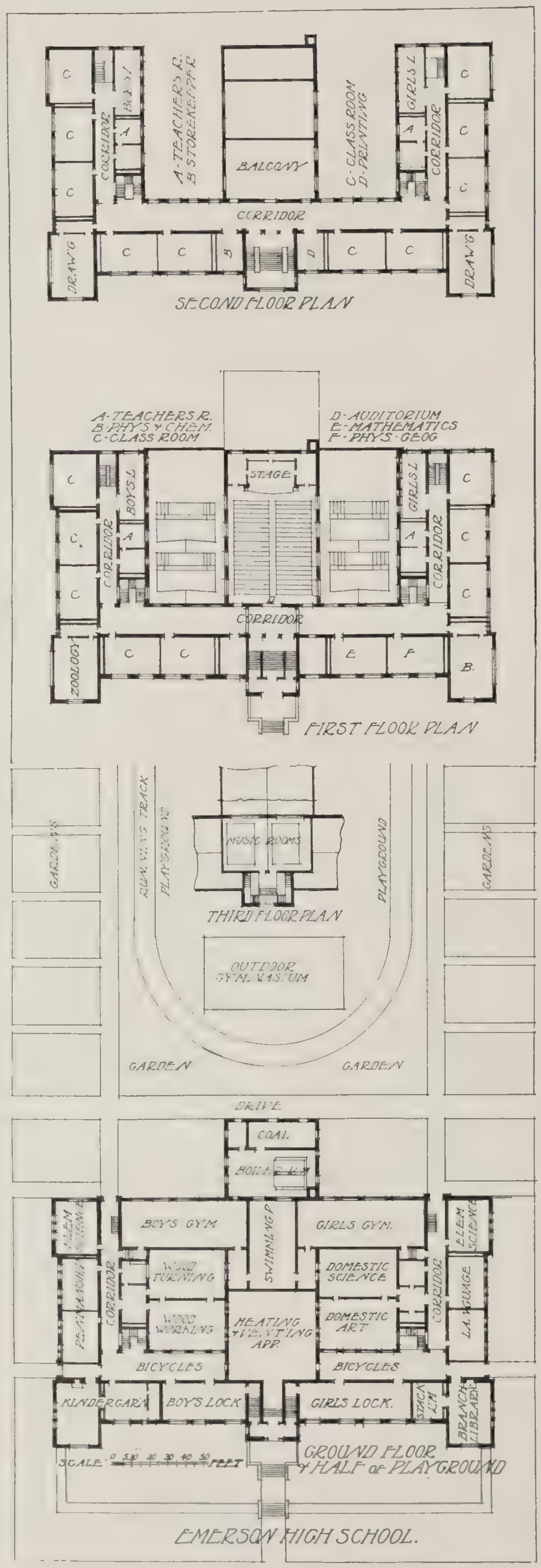
The construction is fireproof except the roof which is of mill construction. All walls are built of vitrified brick laid in cement mortar. The ground floor corridors, manual training rooms, all lockers, toilets, wash rooms, gymnasia, and the swimming pool room have white enamel brick wainscoting 7 feet high. All corridors have marble base. All stairs are of reinforced concrete with asphalt treads, marble risers, stringers, and newels. The closet and urinal stalls in toilet rooms have marble partitions, and are equipped with high-grade plumbing and electric fixtures throughout. The blackboards are natural slate. The interior finish is quarter sawed oak. All window stools are of glazed brick. A program master clock in the principal's office controls secondary clocks, the program bells in all class rooms and corridors and the play ground gongs. A telephone system is installed to necessary points throughout the building with switchboard in the principal's office.

Class rooms and corridors have floors of clear maple, while the ground floor corridor, toilet, locker rooms, etc., have floors of granitoid. The most approved heating and ventilating apparatus is used with automatic temperature and ventilation control. All air for heating and ventilating is washed before it is delivered to school rooms which lowers the temperature about ten degrees during hot weather and raises the humidity of the parched dry air in cold weather. This washer also removes all dust and soot which in a short time would otherwise ruin the school room walls and ceilings which are painted in oil.

In describing the school in his last annual report Mr. Wirt Superintendent of Schools says, "With the customary school organization there are on the ground floor ten regular class rooms, on the first floor twelve, on the second floor twelve, and on the third floor one. This would make a total of thirty-five regular class rooms. With forty children per teacher they would accommodate fourteen hundred children, and on this basis the average architect would compute his per capita cost of the building to be about \$140. However, two of these rooms are intended for a sub-station for the public library, one for a special music room, and another for a special drawing room, which would leave only thirty rooms for the regular class work. Of these thirty rooms four would be required for natural science laboratories where only half school room classes can be accommodated at one time. Thus we would have twenty-six rooms for regular classes of forty students each and four school rooms for classes of twenty students each, making a total of eleven hundred and twenty as the capacity of the building. The actual per capita cost with forty children per teacher would, therefore, be about \$178.

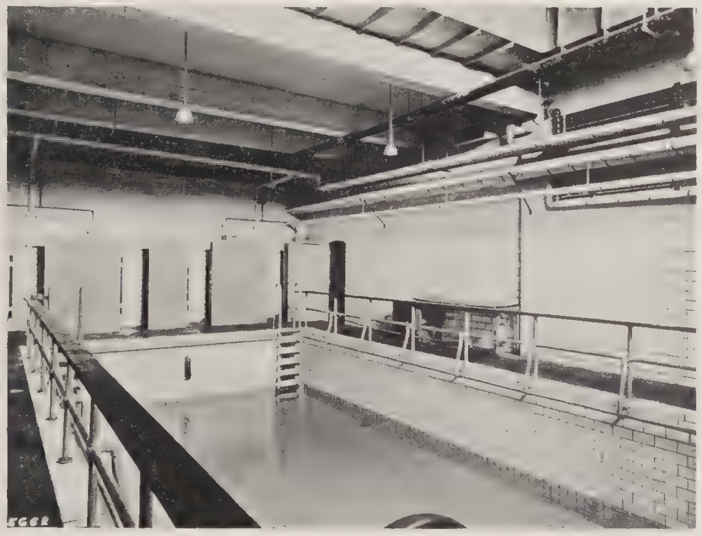
The customary school organization takes for granted that each child must have a regular school desk for his own exclusive use where he can keep his books and equipment. Therefore, when any class is on the playground, in the auditorium, physical culture rooms, laboratories, library, or special class rooms, the regular class room where the school desks of the classes are located is vacant. The separate school desk for each child's own exclusive use means practically that the school must provide two or more places for each child at the same time. Thus the school plant has a capacity for twice the number of children actually accommodated. Besides, the mortgage that the day school pupils have upon the desks prevents the use of the school rooms for night school. An entirely different plan will be used at our Emerson School. Each scholar will have a steel locker for his wraps, books, and equipment. After placing his wraps in his locker on arriving at the school he will take from the locker the books and equipment needed for his work until he is given the opportunity to return to the locker. With this plan no school desk belongs exclusively to any child but may be used by other children during the day school period, and the school plant can be used to accommodate practically double the customary number of children. The day school rooms will also be available for use by the night school. The steel lockers with the book compartments cost much less than the cloak rooms usually provided by the customary school organization and are much more satisfactory.

Figuring the capacity of our building at forty children per class room (or its equivalent) per teacher we are able to accommodate two thousand two hundred and forty children. We hardly expect to accommodate in actual numbers the full capacity figured but fully expect to accommodate easily, on the basis of forty children per teacher, eighteen hundred to two thousand students. This will make the per capita cost of the building about \$100.



EMERSON HIGH SCHOOL.

In addition to accommodating day students the school is so planned that we can accommodate easily fifteen hundred night school students without interfering with the work of the regular day school. With the customary



SWIMMING POOL.

CORRIDOR.

BIOLOGY LABORATORY.

COOKING ROOM.

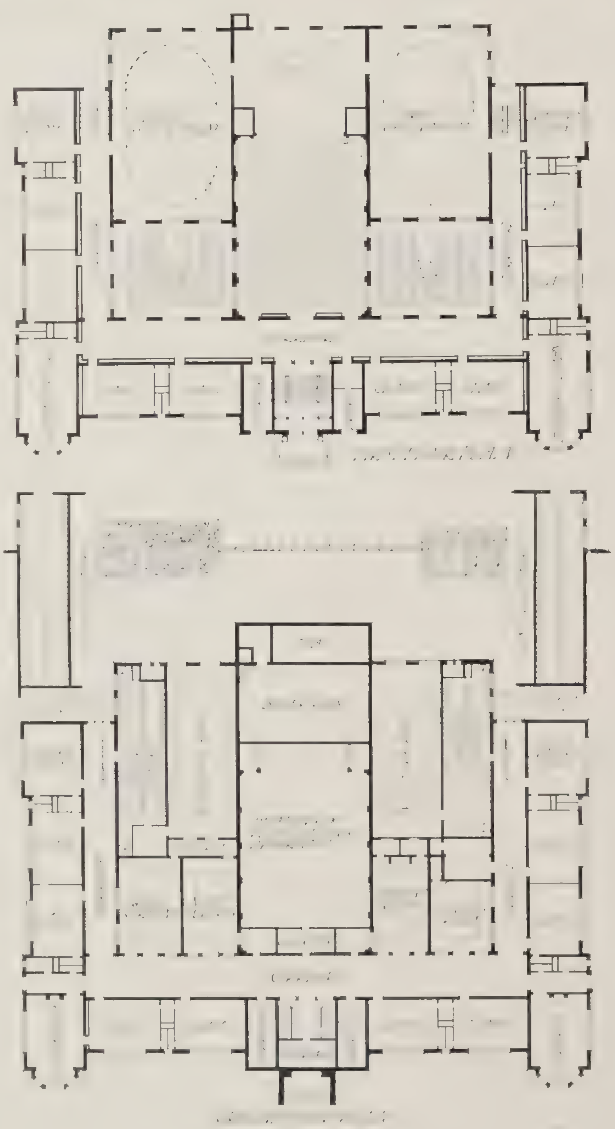
EXTERIOR AND FOUR INTERIOR VIEWS, EMERSON SCHOOL, GARY, IND.
William B. Ittner, Architect.

school organization this cannot be done, because it is difficult to use the regular school rooms occupied by day students with their individual desks for a different set of pupils in a night school.

Gary's school organization plans to train its children for the highest possible school efficiency in the most economical way. The special plan of organization for the Emerson School uses thirty rooms for the regular work which rooms accommodate ten hundred and forty students. While these children are in the regular work an equal number is accommodated in the remainder of the building in special work and play. We thus have two thousand and eighty children accommodated at all times during the day in addition to the kindergarten children. The only principle involved is that of occupying every part of the building all of the school day, and this is simple enough when the building is arranged especially for the purpose.

We are willing to admit that the advantages offered by schools of the type we have planned for Gary seem very extravagant and offer unheard of luxuries, so to speak. Even the largest cities do not have buildings which give the same opportunities to their children. But this type of building is extravagant only in the opportunities offered. From the standpoint of the taxpayer this type of building is extraordinarily economical."

GARY'S SECOND SCHOOL, GARY, IND.



PLANS OF GARY'S SECOND SCHOOL.

GARY'S SECOND SCHOOL BUILDING.

THE second school of the series, plans for which are now in preparation, will provide the same number of class and special rooms, with the addition of a small laundry for instruction in this important part of domestic economy. It will also accommodate the same number of pupils as the Emerson School.

Like the Emerson School it will be located on a large site, 550 by 815 feet, giving the necessary space for a public park and playground which will be fully equipped. Toilet accommodations will be provided in the building for the public grounds.

The special features of the school differing from the Emerson School, will be the abandonment of the general toilet accommodations for the pupils except on the ground floor, and the introduction of toilet rooms opening directly from the class rooms. Where this is an unusual feature it is felt that it will give the supervision necessary in a school of this character and simplify the problem of school management.

Another feature worthy of special mention is the enlarging of the gymnasia, with independent entrances to the playground. There will be also two swimming pools, each 21 by 60 feet, with locker and dresser booth accommodation for four hundred men and three hundred women. All of these will be used by the people of the school district independent of and without interference with the work of the school. The stage will also be enlarged and arranged for use as a third gymnasium.

The teachers in charge of the gymnasia and play in the school will also supervise the public playground. This important part of the municipal work will then be carried on without additional cost to the city other than the first cost of laying out and equipment.

Plans of the new school are given and since the Emerson School is described at length this building will be passed without further comment except that it will cost about $200,000 ready for its equipment.

The Heating and Ventilation of Churches.—II.

BY CHARLES L. HUBBARD.

IN DESIGNING a system of indirect steam, much of the data given for furnace heating will remain the same, and in treating of this it is proposed to take up the different items in order, noting what changes are necessary.

Indirect steam is applicable to much larger buildings, because the heat may be generated in a single boiler, or battery of boilers, and the warm air introduced at a larger number of points. This method of heating may be employed in buildings seating up to five or six hundred people, or even more, although the air supply to the different heating stacks will become somewhat complicated in this case. Where the first cost will allow it, a fan system will give more satisfactory results in churches seating three hundred or more.

Taking this up on the unit basis, as before, the air supply may be taken practically the same as in furnace heating. The grate surface should be increased to 6 square feet in this case to allow for the aspirating coils or flue heaters. The fact that the heat is transmitted in the form of steam instead of hot air, makes no difference in the amount of fuel burned or the size of grate and chimney, provided the same results as regards heating and ventilation are to be obtained.

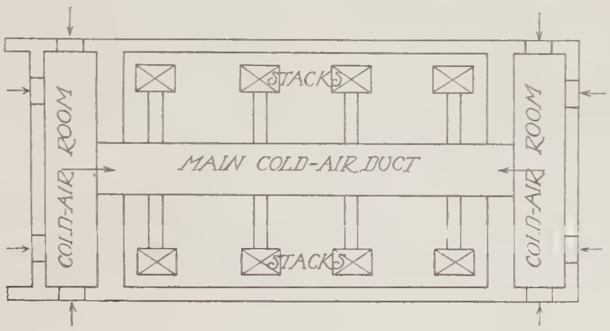


FIG. XII.

The heating stacks in this class of work are commonly made up of indirect pin radiators, placed at the base of the flues. They are usually encased in galvanized iron, although heating chambers of brick may sometimes be used to advantage in the case of large stacks. The total amount of heating surface may be based on the number of occupants, allowing 350 square feet of radiating surface to each one hundred people. One disagreeable feature in connection with furnace heating is the presence of cold drafts beneath large windows. This may be greatly lessened, if not done away with entirely, by placing heating stacks beneath, in the basement and connecting them with narrow grilles extending the full length of the window sill. The rising current of warm air will thus tend to intercept the downward flow of cold air from the surface of the glass, and thus prevent the draft.

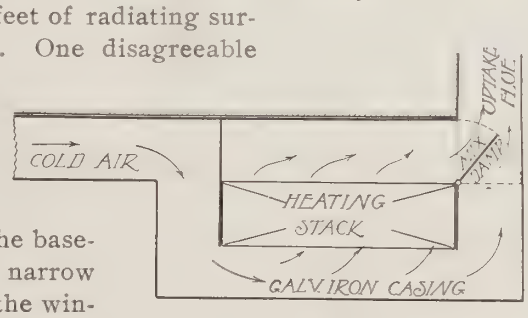


FIG. XIII.

As the number of heating stacks is increased, the difficulty of arranging the cold-air supply becomes greater.

For this reason it seems well to place the larger part of the surface in four stacks at the corners of the room, following out the general arrangement shown in Fig. I, and supplementing this with a series of smaller stacks along each side under the windows, as already described. The main stacks may receive their supply from cold-air rooms, the same as in furnace heating, or from trunk lines as in Fig. XII. When it is not convenient to carry a main duct through the basement as shown, satisfactory results may often be obtained by placing the four large stacks in the cold-air rooms and omitting the bottoms from the casings, thus allowing the air to flow directly through them without the use of supply ducts. The small intermediate stacks may take their supply from special ducts leading from the cold-air rooms, or through special wall openings adjacent to them. The object of the connecting duct, or trunk line, is to make use of changes in the direction of the wind by taking air from all points of the compass, and thus getting the benefit of wind pressure under all conditions. When the cold-air duct is carried through rooms which are to be warmed, it is well to enclose it with a furring of lath and plaster, both on account of looks and to prevent the cooling effect of its exposed surface.

The stacks should be divided into separately valved sections for rough regulation, according to the season, and also be provided with mixing dampers for closer adjustment. These dampers are the same in principle as those used in furnace heating, simply being changed in form to adapt them to the changed conditions, as shown in Fig. XIII. The supplementary stacks beneath the windows are not usually furnished with mixing dampers, but may be divided into two valved sections each.

Provision for air rotation may be made the same as for furnace heating when cold-air rooms are used; otherwise, doors may be provided in the sides of the trunk airways, or in the bottoms of the stack casings, for taking air from the basement.

The size and construction of the supply and vent flues should be practically the same as already described, which, based on the size of the heating stack, will call for $2\frac{1}{4}$ square feet sectional area for each 100 square feet of radiating surface. The stack heater in this case is replaced by an aspirating coil, containing about 60 square feet of radiating surface. With this arrangement it is not necessary to carry the vent flue to the basement, as in furnace heating, because the coil or heater may be placed directly above the vent opening, as shown in Fig. XIV. This has the advantage of simplifying the duct construction, reducing the resistance because the air can flow directly upward, and also of allowing the vent registers to be placed in the wall instead of in the floor, which is a decided advantage on account of cleanliness. The aspirating coil should be in the form of a shallow heater, one or two rows of pipes deep, having a free area between the pipes equal to the full sectional area of the flue in which it is placed. This

result can be secured by making the length of the pipes twice the depth of the flue and placing it in an inclined position as indicated in Fig. XIV. The method sometimes employed of bunching the heating surface in compact form and hanging it in the center of the flue is to be avoided. This arrangement is liable to set up a local circulation within the flue as indicated by the arrows in Fig. XV and tends to weaken the draft through the vent register connecting with the room. In buildings of considerable size more positive results can be obtained, especially in mild and heavy weather, by the use of a discharge fan in place of the aspirating coils in the vent flues. This arrangement will reduce the number and size of the outboard vent flues, which is often an item of much importance. A vent fan in connection with an indirect gravity supply system gives very satisfactory results, and can often be installed at very little, if any, additional cost over a system of natural ventilation with aspirating coils. This is because of the reduction in number and size of flues, omission of coils and piping, and the smaller size of boiler. Disk fans are generally employed for this purpose driven at a moderate speed by direct-connected motors, when a direct current is available. In buildings of medium size it is generally possible to connect all of the vent registers by means of galvanized iron ducts beneath the floor with an exhaust chamber in the basement, from which the fan will discharge the entire volume of air through a single outboard flue which may be located where most convenient. A flue velocity of about 650 feet per minute may be allowed where the fan is made to discharge into the side of the flue and provided with a curved deflector, while 800 feet or more is easily obtained without undue noise when the fan is placed in the base of the flue itself, with the shaft in a vertical position.

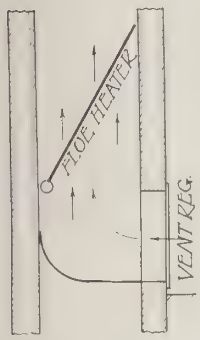


FIG. XIV.

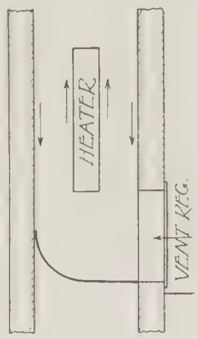


FIG. XV.

TABLE II.

Number of occupants.	Air volume, in cubic feet per min.	Diameter of fan, in feet.	Speed of fan, rev. per min.
300	6,000	3	400
400	8,000	3	530
500	10,000	4	300
600	12,000	4	350
700	14,000	5	200
800	16,000	5	230
900	18,000	6	150
1,000	20,000	6	170

These velocities call for approximately 3½ and 2½ square feet of flue area, respectively, for each one hundred occupants. When the building is of considerable length it may be difficult to connect all of the vent registers with a single exhaust chamber. In cases of this kind two fans may be used, one at each end of the church. Table II gives size and approximate speed of the average disk fan required for moving different volumes of air per minute under the conditions above described.

Arranging the data on the "unit" basis for one hundred people, as in the case of furnace heating, we have the following:

TABLE III.

Data and dimensions for indirect steam heating apparatus, for each one hundred occupants. Outside temperature 0.

Grate surface of boiler, including that required for aspirating coil	6 square feet
Indirect heating surface	350 ,, ,,
Aspirating coil	60 ,, ,,
Supply or warm-air flue	8 ,, ,,
Vent flue	8 ,, ,,
Cold-air supply duct	7 to 8 ,, ,,

The above is for a straight gravity indirect system. When an exhaust fan is used, reduce the size of vent flue as already noted in connection with fans. Here, as in the case of furnace heating, no account has been taken of other rooms besides the auditorium. These may be cared for either by direct or indirect radiation, according to whether ventilation is required or not. The additional boiler power may be figured from the relations already given, counting each 100 square feet of direct surface as 50 of indirect.

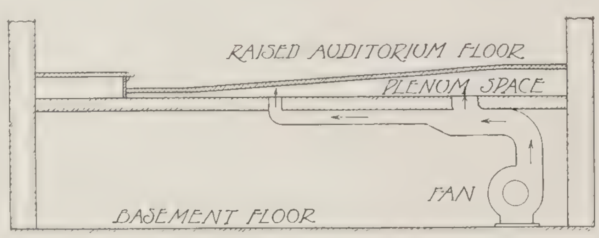


FIG. XVI.

When a supply fan is used, and the fresh air forced in under pressure, it is possible to admit it through a large number of small openings. This changes the general arrangement of the supply and vent openings for several reasons. As the power for moving the air is small, a larger volume of air can be introduced at a lower temperature, which gives practically the same heating effect with better ventilation. Again, as the air can be introduced through a large number of small openings evenly spaced over the entire auditorium floor, it has the effect of causing a solid body of air to rise slowly and uniformly from floor to ceiling, which is the reverse of the action in gravity heating, where the fresh air first rises to the ceiling and then falls to the breathing line, as already described. With a fan system, the fresh air rises directly to the

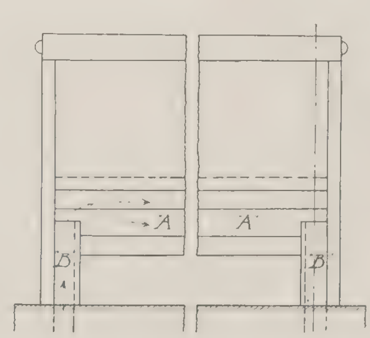


FIG. XVII.

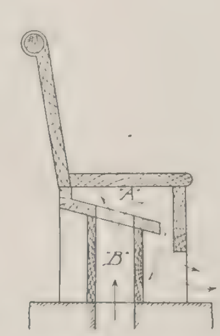


FIG. XVIII.

breathing line, but so slowly that no drafts are felt, and then passes on to the upper part of the room where it is taken off through ceiling vents instead of being removed at the floor level.

One of the best methods of air distribution is shown in diagram in Fig. XVI. A plenum space is provided by constructing a false floor, and the air discharged into this by the fan, as indicated. This provides a reservoir of fresh warm air under the entire auditorium floor which may be introduced into the room through the pews as shown later in Figs. XVII to XX. When the plenum space is shallow it is well to introduce the air at several points, in order to secure an even distribution of pressure without high velocities. When there is a height of 2 or 3 feet at the rear, it is generally sufficient to introduce the air at one or two points, providing suitable baffle plates for distributing it evenly. When the raised floor cannot be used, the same result may be secured by carrying a series of ducts at the basement ceiling and connecting with the pews above. One of the most satisfactory methods of admitting and distributing the air is shown in Figs. XVII and XVIII. A shallow chamber is constructed beneath the seat of each pew, and shown at "A" "A" in the cuts. This connects with the plenum space at each end by means of small uptakes "B" "B" built into the pew, as shown. From the chamber "A" the air passes into the room through a slot about 1¼ to 1½ inches in width, extending the entire length of the pew. The area of the slot is so large that the air issues at a velocity so low that no unpleasant drafts are felt by the occupants. When the plenum space beneath the floor is employed, it is not usually necessary to use a tube for connecting it with the pew. Openings are simply made in the upper floor, of the proper size and form, and the pew ends or legs set over them. When ducts are used at the basement ceiling, it is necessary to use sleeves, or thimbles, extending up through the floor and into the pew openings to avoid leakage. The uptakes "B" "B" should have an area of at least 4 square inches per occupant.

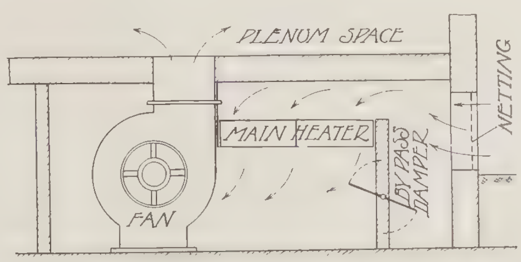


FIG. XXI.

Another arrangement which may be used, where that above described is considered too expensive, is shown in Figs. XIX and XX. In this case a grille is placed in the end of every other pew, alternating on each side of the aisle, and is connected with a duct carried along the basement ceiling, by means of a galvanized iron uptake-sleeve shown at "C" "C."

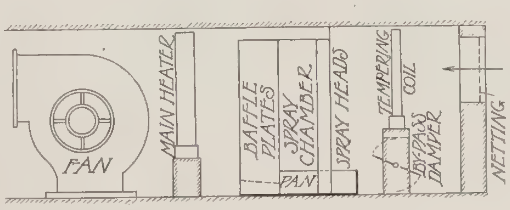


FIG. XXII.

If allowance is made for an average of five people in each pew, and a grille is provided in every other pew, it must supply 2 by 10 by 25 = 500 cubic feet of air per minute. Allowing a velocity of 350 feet per minute over the entire face of the register will call for 1½ square feet of area. A better arrangement is to use two registers to each uptake, one discharging into the aisle as shown and the other throwing part of the air into the pew. In order to make this arrangement as perfect as possible, an uptake and two grilles, or registers, should be provided for each pew, which makes it as expensive as the arrangement shown in Figs. XVII and XVIII.

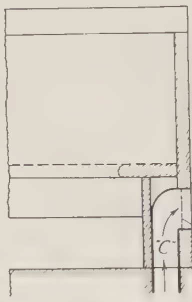


FIG. XIX.

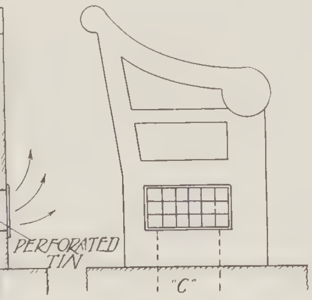


FIG. XX.

The uptake "C" should have a sectional area of at least ½ square foot for 500 cubic feet of air, and one-half that when an uptake is carried to each pew. An even flow over the entire register face may be secured by inserting a piece of perforated tin having a free opening equal to about one-third of its gross area. The position of this is indicated in the cut. The air supply to the pew uptakes is usually made by means of trunk lines connecting with the fan, and carried at the basement ceiling below the center of each aisle.

Fans for church ventilation should be run at comparatively low speeds on account of noise, and are best driven by direct-connected electric motors, if a direct current is available. If an alternating current must be resorted to, a high-speed belted motor must be used, placing a sound deadener between the base of the motor and the foundation, and covering it with a wooden box having an asbestos lining.

When the air is blown through a heater at a high velocity by means of a fan, a greater amount of heat is obtained per square foot of radiation, due to the more rapid condensation of the steam within it. For this reason, less radiating surface will be required with a fan system than in the case of indirect gravity heating.

The size and maximum speed of fan for handling different volumes of air, under the conditions of church work, are given in Table IV.

TABLE IV.

Diameter of fan, in feet.	Maximum speed at which fan should run, rev. per min.	Cubic feet of air delivered per minute.
3	300	4,200
4	250	8,200
5	225	14,000
6	200	20,800
7	175	27,600
8	150	36,400
9	125	43,200
10	100	48,000

Under average conditions, allowing an air supply of 25 cubic feet per minute per occupant, the main heater at the fan should contain about 230 square feet of radiating

surface for each one hundred occupants. A fan system supplying air to the room through the pews, as described, can only be used for warming when the fan is running; hence a supplementary system must be provided for heating the auditorium when the fan is not in operation. There are different methods for doing this, depending upon local conditions. One arrangement is to use direct radiators, concealed by screens, while in other cases, indirect stacks are hung beneath the floor, with registers above them, and taking air from inside the building by rotation. In either case, the supplementary system should be placed on a separate line of piping, so that it can be turned on or off by a single pair of valves.

The amount of heating surface in the supplementary system must be computed in each special case, according to the amount of wall and window surface, and has no fixed relation to the fan system. The type of boiler used in this size of building is usually rated on a horsepower basis, and may be proportioned according to the data given below.

TABLE V.

One boiler horsepower will supply:
25 square feet of radiation at the fan.
100 square feet of radiation in the form of rotation heaters beneath the floor.
130 square feet of direct radiation placed in the room.

Here, as before, only the auditorium has been considered, and other rooms must be taken up independently, and sufficient boiler power furnished to care for them.

A typical arrangement of fan and heater is shown in diagram in Fig. XXI. The heater in this case is made up of pin radiator sections, and supported at an elevation above the floor. The path of the air is indicated by the arrows and its temperature is regulated partly by shutting off certain sections by means of valves, and partly by use of the by-pass damper, which allows cold air to enter the fan without passing through the heater. The fan in this case is arranged to discharge directly into a plenum chamber beneath the main floor of the auditorium. Fig. XXII shows the general arrangement for an air washer, or purifier, in connection with a fan and heater. The air is first drawn through a primary heater, or tempering coil, to raise its temperature above the freezing point. It then passes through a spray of water which removes the dust and soot; then through a series of baffle plates for removing the spray, and finally through a secondary or main heater for raising it to the required temperature before entering the fan. The heaters shown in this case are made up of vertical wrought-iron pipes instead of cast-iron sections. The outer one is commonly made two rows deep, and provided with a by-pass damper. The secondary heater is usually divided into valved sections, and in some cases is provided with a by-pass also.

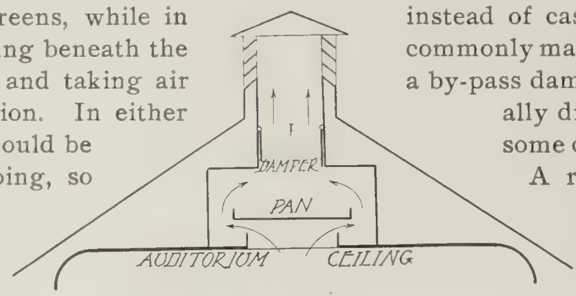


FIG. XXIII.

A roof section showing a typical arrangement for a ceiling vent is illustrated in Fig. XXIII. When a supply fan is used, it is not usually necessary to provide either an exhaust fan or aspirating coils, as the pressure created within the room is sufficient to force the air out without other means. The ceiling and roof vent should have from 3 to 4 square feet sectional area for each one hundred occupants, and should be so designed that rain and snow cannot find its way into the auditorium in case of temporary back drafts. Such an arrangement is shown in Fig. XXIII.

Fig. XXIV shows an interior view of the First Church of Christ, Scientist, Boston, and illustrates a practical application of the principles previously described. An air supply of approximately 90,000 cubic feet per minute is forced into the auditorium by means of four centrifugal fans located in the basement. The air first passes through washers, is then reheated, and discharged into a plenum space beneath the raised floor, in a manner similar to that shown in Fig. XVI. From here it reaches the auditorium through pews designed on the general principle illustrated in Figs. XVII and XVIII. The fresh-air supply to the balconies is the same as on the main floor, special plenum spaces being provided for this purpose.


FIG. XXIV.

The supplementary heating system for warming the church, when the fans are not in operation, consists of direct radiators placed back of bronze grilles beneath the first floor windows, and of rotation heaters beneath the gallery floors. The exhaust ventilation is through a large concealed vent in the domed ceiling, which in turn connects with outboard vents designed especially to prevent the inleakage of rain and snow.

The Comparative Costs of a House of Moderate Size When Constructed of Brick, Wood, Cement, or Hollow Block.

AT THE annual meeting of the Building Brick Association, held at Louisville, Ky., February 7th, 8th and 9th, the secretary, Mr. J. Parker B. Fiske, submitted a report of an extensive investigation which he had conducted to determine the relative cost of a small house built of brick, frame and other types of construction. The very thorough manner in which Mr. Fiske has gone into this subject gives to his figures a value which is not usually credited to data of this nature.

Mr. Fiske procured plans and specifications of a given house, to ascertain by actual bids from a number of reliable contractors its difference in cost when constructed of frame, brick, cement, or hollow block. For this purpose a small, modern eight-room house of good design and excellent arrangement was chosen, the original having been actually built at Beverly Farms, Mass., under the direction of Thorndyke & Kiessling, architects. This house is typical in size, arrangement and cost to thousands of houses which are being erected throughout the country.

The architects were commissioned to prepare the plans and specifications necessary for obtaining bids for this house when built with the following types of exterior wall construction, all other details being common to all types.

DESCRIPTION OF VARIOUS TYPES OF OUTER WALL CONSTRUCTION.

Type 1. Frame covered with boards and finished with clapboards over building paper; inside surface furred, lathed and plastered.

Type 2. Frame covered with boards and finished with shingles over building paper; inside surface furred, lathed and plastered.

Type 3. A 10-inch brick wall, i.e., two 4-inch walls tied together with metal ties and separated by a 2-inch air space; inside surface plastered directly on the brickwork. Face brick to cost $17.50 per M.; inside brick, $9.00 per M.

Type 4. A 12-inch solid brick wall; inside surface furred, lathed and plastered. Face brick to cost $17.50 per M.; inside brick, $9.00 per M.

Type 5. Eight-inch hollow terra cotta blocks, stuccoed on the outside and plastered directly on the inside.

Type 6. Six-inch hollow terra cotta blocks, finished with a 4-inch brick veneer on the outside and plastered directly on the inside. Face brick to cost $17.50 per M.

Type 7. Frame covered with boards and building paper, furred and covered with stucco on Clinton wire cloth; inside surface furred, lathed and plastered.

Type 8. Frame covered with boards (building paper omitted), and finished with a 4-inch brick veneer on the outside; inside surface furred, lathed and plastered. Face brick to cost $17.50 per M.

Type 9. Frame finished on the outside with a 4-inch brick veneer tied directly to the studding (boarding omitted); inside surface furred, lathed and plastered. Face brick to cost $17.50 per M.

A separate drawing showing the details of each type of outer wall construction was prepared, and each was accompanied by a set of complete specifications for the entire house.

Everything about the house, except the outer wall construction, was identical in all nine types, and may be briefly covered by the following tables:

DETAILS COMMON TO ALL TYPES.

A—Foundations	Local Stone.
B—Cellar Floor	Finished with 2-inch concrete of Portland cement.
C—Chimney	Faced with Brick costing $17.50 per M.
D—Fireplaces	Faced with Brick costing $17.50 per M.
E—Plastering	First-class "two coat" work.
F—Exterior Finish	Cypress.
G—Blinds	White pine.
H—Screens	Copper bronze on white pine frames.
I—Window Frames	Hard pine.
J—Floors	Double floors throughout, with paper between, except in unfinished attic; Georgia Pine upper floors; main hall on first floor of oak.
K—Inside Finish	North Carolina Pine.
L—Doors	Washington Cedar.
M—Hardware	Bronze finish of ordinary type, costing $60.00 for the job.
N—Wood Mantels	$45.00 each.
O—Conductors	Copper.
P—Flashing	Tin.
Q—Electric Fixtures	Costing $80.00.
R—Hot Water Heating	Costing $250.00 complete.
S—Wiring	Costing $68.00.
T—Plumbing	Costing $370.00.
U—Painting	Exterior and interior; clapboard house, $225.00; other houses, $130.00.
V—Glazing	Double thick German glass.

NOTE. — Shades, kitchen range and tile work not included.

The following contractors of well-known reputation and experience were then selected: W. F. Kearns Company, Boston, Mass.; McDonald & Joslin Company, Boston, Mass.; P. H. Jackson and Son Co., Brockton, Mass.; R. D. Donaldson, Lincoln, Mass.; J. T. Wilson & Son, Nahant, Mass.

Each contractor was fully advised of the object of this investigation, and was asked if he were willing to undertake the preparation of figures which should truthfully set forth, to the best of his ability, the cost (including his profit), of a house to be built within ten miles of Boston, according to these plans and specifications. Mr. Fiske impressed them all with the fact that he desired to know the exact truth; and if, as alleged by some contractors, the cost of a brick house is twenty-five to thirty per cent more than one of wood, that he wished to know it, as nothing could be gained by an investigation of this kind which was biased or influenced by any favoritism for one type over another. The contractors entered into the spirit of the investigation heartily, and agreed to figure out the cost fairly, to the best of their ability. Each one was given the same information and instructions, and asked to take plenty of time to figure the entire house with care.

The following bids were submitted by the five contractors in question, arranged without reference to the above order of names, each bidder standing ready to enter into a contract for the house in question at the figures submitted:

COMPARATIVE BIDS.

Type No.	1	2	3	4	5	6	7	8	9
Description	Clapboard	Shingle	10-inch Brick Wall Hollow	12-inch Brick Wall Solid	Stucco on Hollow Block	Brick Veneer on Hollow Block	Stucco on Frame	Brick Veneer on Boarding	Brick Veneer on Studding
Bid No. 1	$6,732.00		$7,572.00		$7,416.00	$7,777.00	$6,857.00	$7,130.00	$7,080.00
Bid No. 2	6,235.76	$6,370.40	6,736.43	$7,105.00	6,491.23	6,762.83	6,410.00	6,746.20	6,664.88
Bid No. 3	6,692.00	6,786.00	7,118.00	7,418.00	7,179.00	7,238.00	6,847.50	6,970.00	6,895.00
Bid No. 4	6,690.00		7,496.00	7,801.00	7,202.00	7,648.00	7,000.00	7,496.00	7,420.00
Bid No. 5	7,450.00	7,450.00	7,940.00	8,240.00	7,650.00	7,990.00	7,650.00	7,790.00	7,710.00
Average of Bids	6,759.95	6 868.80	7,372.48	7,641.00	7,187.65	7,483.16	6,952.90	7,226.44	7,153.98

A comparison of these five bids, with reference to the excess cost of the various types as compared with the clapboard house, was also shown:

COMPARATIVE BIDS.

PERCENTAGE EXCESS COST OF EACH TYPE OVER CLAPBOARDS.

Type No.	1	2	3	4	5	6	7	8	9
Description	Clapboard	Shingle	10-inch Brick Wall Hollow	12-inch Brick Wall Solid	Stucco on Hollow Block	Brick Veneer on Hollow Block	Stucco on Frame	Brick Veneer on Boarding	Brick Veneer on Studding
Bid No. 1	.0		12.5		10.2	15.5	1.9	5.9	5.2
Bid No. 2	.0	2.1	8.0	13.9	4.1	8.4	2.8	8.2	6 9
Bid No. 3	.0	1.4	6.4	10.8	7.3	8.2	2.3	4.2	3.0
Bid No. 4	.0		12.0	16.6	7.7	14.3	4.6	12.0	10.9
Bid No. 5	.0	.0	6.6	10.6	2.7	7.2	2.7	4.6	3.5
Average of Bids	.0	1.6	9.1	13.0	6.3	10.7	2.9	6.9	5.8

In presenting the bids Mr. Fiske said: "As might be expected, a considerable variation appears among the figures submitted by the different contractors. No two contractors, even of equal skill and experience, will figure exactly the same cost on a given set of plans and specifications. Elements of chance must be considered, such as fluctuations in the market price of material and labor, weather conditions, and unexpected difficulties in construction. Moreover, each man's figure will be influenced to some extent by the measure of his desire to secure the contract in question; in fact, it is doubtful if the same contractor would bid exactly the same on different occasions, even for precisely the same structure. Moreover, if these variations are encountered in obtaining the cost of a given building in a given place, still wider differences will arise in obtaining bids for different localities where the price of material and conditions of labor are different. For this reason a certain amount of discrepancy between different authorities must be accepted as inevitable, and must not be allowed to throw suspicion on the figures."

In order to arrive at some definite figure which would fairly and equitably set forth the difference in cost of these various types of construction, the general average of all five bids was taken, in addition to the two most favorable bidders as shown in the tables below:

COMPARATIVE BIDS.

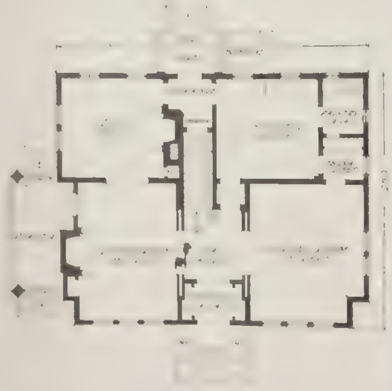
AVERAGE FIGURES.

Type	Description	Average Bid	Excess Over Clapboards	Percentage Excess Over Clapboards
No. 1	Clapboard	$6,759.95		
No. 2	Shingle	6,868.80	$108.85	1.6
No. 3	10-inch Brick Wall — Hollow	7,372.48	612.53	9.1
No. 4	12-inch Brick Wall — Solid	7,641.00	881.05	13.0
No. 5	Stucco on Hollow Block	7,187.65	427.70	6.3
No. 6	Brick Veneer on Hollow Block	7,483.16	723.21	10.7
No. 7	Stucco on Frame	6,952.90	192.95	2.9
No. 8	Brick Veneer on Boarding	7,226.44	466.49	6.9
No. 9	Brick Veneer on Studding	7,153.98	394.03	5.8

COMPARATIVE BIDS.

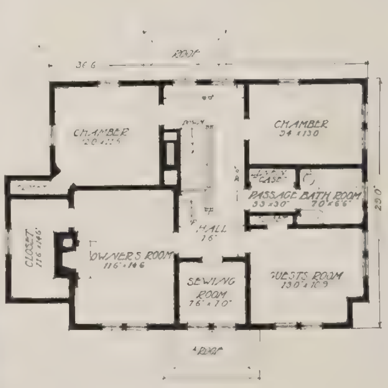
AVERAGE OF THE TWO MOST FAVORABLE BIDS.

Type No.	1	2	3	4	5	6	7	8	9
Description	Clapboard	Shingle	10-inch Brick Wall Hollow	12-inch Brick Wall Solid	Stucco on Hollow Block	Brick Veneer on Hollow Block	Stucco on Frame	Brick Veneer on Boarding	Brick Veneer on Studding
No. 3	$6,692.00	$6,786.00	$7,118.00	$7,418.00	$7,179.00	$7,238.00	$6,847.50	$6,970.00	$6,895.00
No. 5	7,450.00	7,450.00	7,940.00	8.240.00	7,650.00	7,990.00	7,650.00	7,790.00	7,710.00
Average	7,071.00	7,118.00	7,529.00	7,829.00	7,414.50	7,614.00	7,248.75	7,380.00	7,302 50
Excess Over Clapb'ds		47.00	458.00	758.00	343.50	543.00	177.75	309.00	231.50
Per cent Excess Over Clapb'ds		.7%	6.5%	10.7%	4.9%	7.7%	2.5%	4.4%	3.3%



FIRST FLOOR PLAN.

HOUSE AT BEVERLY FARMS, MASS.



SECOND FLOOR PLAN.

Mr. Fiske in speaking of the two most favorable bids says: —

"The two concerns referred to in the last table were very well prepared to make an accurate comparison on this particular kind of building. Mr. Joslin, of the McDonald & Joslin Company, has made a thorough study of estimating different types of small and moderate-sized buildings, and is a well-known authority on the subject. Mr. Donaldson has made a specialty of all kinds of small house construction for many years. Their figures, like all the others, were prepared absolutely independently, and while they vary considerably in the totals, their percentage difference between the different types is in remarkably close agreement."

In making up his figures, Mr. Joslin used the following:

PRICE OF MATERIALS.

Lime	$1.00 per bbl., 200 lbs.
Portland Cement	$1.60 per bbl.
Spruce Framing	$26.00 per M. ft. B. M.
North Carolina Pine	1c. per inch per ft.
Georgia Matched Pine (first quality)	$75.00 per M. ft. B. M.
Shingles	$4.75 per M.
Clapboards	$55.00 per M.
Hemlock Boarding	$22.00 per M. ft. B. M.
6-inch Hollow Blocks	10½c. per sq. ft.
8-inch Hollow Blocks	14c. per sq. ft.
Face Brick	$17.50 per M.
Common Brick	$9.00 per M.
Allowance for Furring, Lathing, and Plastering	5c. per sq. ft.
Wages of Bricklayers	60c. per hour.
Wages of Carpenters	50c. per hour.

The cost of lumber displaced by brick on Types 3, 4, 5 and 6, would be as follows:

Frame and Studding, 2,300 ft. B. M., @ $26.00 per M.	$59.80
Square Edge Boards, 2,500 ft. B. M., @ $22.00 per M.	55.00
Spruce Clapboards, requiring for manufacture 600 ft. of stock, B. M.	93.50
Total, 5,400 ft. B. M.	$208.30

These figures may be used in comparison with prices of similar materials and labor in other markets, and by adjusting the differences they could be made applicable in all sections of the country.

Plate Illustrations—Description.

Three New Schools, St. Louis, Mo. Plates 29, 30 and 31. The new Carr School cost exclusive of building site and equipment $113,400 or 20.67 cents per cubic foot. The new Lyon School cost exclusive of building site and equipment $131,692 or 23.80 cents per cubic foot. The new Humboldt School cost exclusive of building site and equipment $176,832 or 16.95 cents per cubic foot.

Westwood School, Cincinnati, Ohio. Plates 33, 34. The exterior of this building is finished with a reddish brown, wire-cut brick, laid in a light gray mortar. All the trimmings are terra cotta, the color of which is a trifle more yellow than buff Bedford. The panel over the main entrance is executed in rich brown, green and buff, and the iron grilles are finished in green. The location of this school being five miles from the business center of the city, and so far removed from the central library and gymnasium, it was necessary to make the library in the school building of sufficient size to be used as a branch library, and at the same time increase the size of the gymnasium. The auditorium will be used for semi-public gatherings as well as an assembling place for the village. The total cost of the building, including equipment, heating, ventilating, etc., was approximately $197,950, making the price per cubic foot 17.5 cents.

Lincoln School, Lincoln, Mass. Plate 32. This school, which was built for children of the lower and middle grades, contains six class rooms, teachers', superintendent's and play rooms. The building is built of water-struck brick with wood and marble trim and slate roof. Upon the interior the finish is of hard wood throughout and stairs of iron. All the class rooms are on the south side. The ventilating ducts are all gathered together in the roof space and brought out through the cupola in contrast to the usual system which necessitates ventilators coming up through the roof. The grade drops sharply on the south side permitting of basement entrances for boys and girls at grade, and light for the play rooms. The cost per cubic foot of this building complete, including ventilating apparatus, plumbing, etc., but exclusive of architects' fees was 19.4 cents.

Church of St. John, Kingsbridge, New York City. Plates 39, 40. The foundations for the nave of this church were built some fifteen years ago for a small church with a seating capacity of six hundred. It was designed in the Romanesque style with nave and aisles, corner tower, etc. The foundations were roofed over and the basement used for church purposes, until the demands of the parish required an edifice, capable of seating one thousand people. The old foundation extended to about the point where the present transepts start. The new building starting from this point included the transepts and sanctuary from the foundations. The treatment of the exterior design was therefore established as to the window spacing and entrances. A distinctive feature of the plan is that there are no interior columns or piers. The foundations are built of granite, the water table and all other trimmings and tracery are of mat glazed white terra cotta. The face brick are 3 by 12 inches impervious, light buff, laid with ¾ inch white joints and the roof is laid with green slate. The decorative panels in front are of faience, while the entrance steps and cheeks are of gray Tennessee marble with a honed finish. The building as described above cost approximately $100,000.

Tanners National Bank, Catskill, N.Y. Plates 41, 42. The exterior of this building is of Vermont marble on the street and alley façades while the rear extension and storage loft are of pressed brick. This bank was originally organized for the convenience of the tanning trade which accounts for the head of a steer appearing above the key-stone and in one of the medallions. The building is of fireproof construction throughout, the floor and roof slabs being supported upon steel construction. The main banking room is 27 feet from the floor to the under side of the lower skylight, which is glazed with No. 01 glass giving a diffused light throughout. The flooring

is of gray Knoxville marble tile and the wainscoting and counterscreen of pink Knoxville with a honed finish. The upper portion of the counterscreen is of mahogany, the walls are finished in plaster painted a delicate shade of French gray, and the ornaments including the enriched cornice and coffered ceiling are finished in gold. The clock above the vault is an example of Louis XVI work formerly in the New York State Capitol building. The cost of the building was as follows: General construction, $31,153.07; vault, $7,000; iron grille, $325; interior wall decorations, $1,300; metal furniture, $1,300; customers' desks and grilles, $543; clock, $150; electric clock attachment, $20.84; and electric lighting fixtures, $495.75. The total cost amounted to $42,300. The cubical contents estimated from the under side of the floor slab in the basement to the upper side of the roof slabs is approximately 95,000 cubic feet, which gives a cost per cubic foot of 44.5 cents.

Editorial Comment and Miscellany.

TUBERCULOSIS ASSOCIATION.

THE Boston Association for the Relief and Control of Tuberculosis should be commended in their efforts to prove the great advantage of fresh air as a factor in health. The association assumes that it is within the power of most architects, as well as their duty, to encourage life in the open with the maximum of time spent in the fresh air. They claim that there is and should be an increasing demand for open sleeping porches, balconies and roof spaces. They urge that in constructing stores, shops and mercantile establishments owners should be persuaded to provide open air accommodations for noon luncheons and recreation. The roof is the most available spot for these resting places. It could easily be turned into open air rests at little expense and with their wide commanding views and abundance of fresh air would eventually pay for themselves in the increased efficiency of the force using them. They cite the remarkable results obtained in open air schools for anæmic and tubercular children, with a demand for open air rooms, having at least one end that can be thrown entirely open. In constructing new school buildings they show how the roof may be used for both teaching and recreation purposes, removed as it is from the dusty, dirty, and noisy streets. This work, is being urged upon all members of the architectural profession.

DETAIL FOR FIFTH WARD SCHOOL, ATLANTA, GA.
Executed by the Atlanta Terra Cotta Company.
W. A. Edwards, Architect.

DETAIL FOR PUBLIC SCHOOLS NUMBERS 34 AND 35, JERSEY CITY, N. J.
Executed by the South Amboy Terra Cotta Company.
Rowland & Eurich, Architects.

CATHEDRAL IN MARBLE.

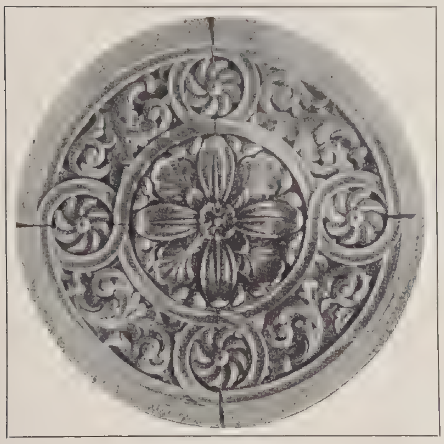
A GOTHIC cathedral of white marble is being erected in the city of Buffalo from designs of Aristides Leonori, the church architect of Rome. The cathedral will be 250 feet in length, the nave 100 feet in width and the transepts 150 feet. The height of the edifice will be 100 feet with its two towers having an additional height of 150 feet. The marble walls of the exterior will be tooled, while the interior walls and marble pillars will be polished. When completed the cathedral will contain seven marble altars and pews together with other furnishings in harmony with the architectural treatment. The estimated cost of the structure is $500,000 exclusive of furnishings.

DETAIL BY THE NEW JERSEY TERRA COTTA COMPANY.
Warren & Wetmore, Architects.

CONGRESS OF TECHNOLOGY.

THE Congress of Technology will be held in Boston, April 10th and 11th of this year. The first of these dates is the fiftieth anniversary of the chartering of the Massachusetts Institute of Technology, and the primary purpose of the Congress is fittingly to mark that anniversary. A large number of Technology graduates who have been conspicuously successful in varied lines of engineering will present papers at the Congress, dealing with various aspects of the country's manifold industrial problems and treating of those problems not only as they exist now but as they promise to take different shape in the future. The whole body of papers will therefore constitute a survey of engineering

and industrial science as a whole, from a body of men who speak from first-hand experience with industrial problems all over the country.



DETAIL EXECUTED BY THE O. W. KETCHAM TERRA COTTA WORKS.

FIFTH AVENUE, NEW YORK CITY.

THE committee appointed to advise the Fifth Avenue Association in its effort to make this thoroughfare as pleasing to New York as any avenue in the world has recommended that the Borough President be granted supervisory powers by legislative action. In connection with this conclusion arrived at by the three architects, William M. Kendall, Arnold W. Brunner and the late John M. Carrère who served on the committee, a memorandum was also submitted. The memorandum, while it commends a rivalry in the beauty and character of the various buildings, urges that it be kept in due subordination to the rest of the block as a whole in order to preserve a generally satisfactory appearance. The thought is expressed that the present blocks contain too many separate units, most of which are vertical in their main effect, and that this could be overcome by carrying through strong horizontal courses and by harmony of color. Such a result could be realized only through the willingness of architect and owner to yield their individual interests for the benefit of the whole.

PLANS FOR THE NEW YORK CENTRAL RAILWAY STATION.

PLANS for the main section of the new Grand Central Station by Reed & Stem and Warren & Wetmore, architects, were filed with the Building Department, New York City, January 13th. The new station will occupy the plot facing 42d street on which the old station stood. The main façade will be of brick, granite and limestone. The building will be set back several feet, in order to accommodate a large plaza approach. A distinctive feature will be the continuation of Park avenue over 42d street by means of a viaduct similar in design to one of the bridges in Paris. The cost of this building is estimated at $4,000,000.

STORE AND APARTMENT BUILDING, WASHINGTON, D. C.
Exterior of "Tapestry" brick made by Fiske & Co., Inc.
A. B. Heaton, Architect.

AMERICAN ACADEMY IN ROME.

THE American Academy will soon be transferred from its present home, the Villa Mirafiore, to the Villa Aurelia. The new quarters which were left to the Academy by the late Mrs. C. J. Hayland are situated on the top of the Janiculum Hill.

ROTCH TRAVELING SCHOLARSHIP.

THE preliminary examinations for the Rotch Traveling Scholarship will be held at the office of the Secretary, C. H. Blackall, 20 Beacon street, Boston, on Monday and Tuesday, April 10th and 11th, to be followed by the sketch for competition in design on Saturday, April 15th. The successful candidate receives $2,000, to be expended in foreign travel and study during two years. Candidates must be under thirty years of age, and must have been engaged in professional work during two years in the employ of a practising architect resident in Massachusetts.

DETAIL FOR HEARST BUILDING.
Executed in polychrome enamel terra cotta by Northwestern Terra Cotta Company.
James C. Green, Architect.

PRIZES AWARDED IN BUILDING TRADES EMPLOYERS' ASSOCIATION COMPETITION.

THE awards in the small house competition conducted by the B. T. E. A. are as follows: $4,500 House — First prize, Stephen Goossen, Detroit; Second prize, William J. Ryder, Philadelphia; Third prize, James W. O'Connor, New York City. $2,500 House — First prize, Robert L. Stevenson, New York City; Second prize, C. Mink and L. A. Carson, New York City; Third prize,

EXTERIOR DETAIL OF PUTNAM BUILDING, TIMES SQUARE, NEW YORK CITY.
Terra cotta furnished by the Atlantic Terra Cotta Company.
Charles A. Platt, Architect.

Norman B. Baker, Troy, N. Y. The committee judging the contest were William A. Boring, Donn Barber and Grosvenor Atterbury.

APARTMENT HOTEL, CENTRAL PARK, WEST, NEW YORK.
Terra cotta furnished by the New York Architectural Terra Cotta Company.
Mulliken & Moeller, Architects.

LEBARRE PRIZE, PARIS.

FIRST place in the competition for the Lebarre prize in architecture at the École des Beaux Arts has been won by Ely J. Kahn, New York City. The problem was an immigration station and had to be finished in three days from the time of announcement. This is the first time that the honor has been brought to America and was won against seven hundred and fifty competitors. Mr. Kahn who is a student in the atelier of Redon will soon graduate from the École des Beaux Arts.

$3,000,000 COLLEGE.

THE plans for the Graduate College at Princeton by Cram, Goodhue and Ferguson, architects, have been approved by the trustees of that university. The proposed group consists of the Thompson Graduate College, the Procter Memorial Dining Hall and the Cleveland Tower. The buildings which are to be completed by September, 1912, will be fireproof throughout and cost approximately $3,000,000.

CROSBY HALL, LONDON.

CONSIDERABLE anxiety was felt when Crosby Hall, the last remaining specimen of a mediæval mansion of a London merchant, was torn down. But its individual stones were carefully numbered and the whole building has been re-erected on the north bank of the Thames at Chelsea.

CARTOUCHE.
Made by American Terra Cotta & Ceramic Co.
Spier, Rohns & Gehrke, Architects.

Not a single feature of the charming structure has been destroyed; the beautiful oriel window terminating in richly decorated stone vaulting and the old wooden roof over the main structure of the hall reappear as originally constructed. The hall stands clear of other buildings and shows its fine proportions to greater advantage than amid its former surroundings.

ANCIENT FRESCOES IN LOW AND HIGH RELIEF.

IN THE immediate vicinity of Pompeii recent excavations have disclosed a magnificent mansion containing more than twenty rooms, open air courts and enclosed gardens. The rooms are adorned in fresco paintings, intended to imitate sculpture both in low and high relief. Ionic columns have the appearance of being detached from the wall surface, while the interstices of painted grilles seem to be true perforations. Many of the frescoes contain imitations of ancient sculptures as well as architectural conceptions.

NEW BOOKS.

Academy Architecture and Architectural Review. Second volume, 1910, edited by Alex. Koch, architect, and published at "Academy Architecture," 58 Theobald's Road, London. Agent for the United States, J. H. Jansen, Cleveland, Ohio.

American School Building Standards. Wilbur T. Mills, architect. A book dealing with design, plan and equipment for schoolhouses. Columbus, Ohio, Franklin Educational Publishing Company.

Garages and Motor Boat Houses. Designs for private and commercial buildings by architects from different sections of the country, compiled by William Phillips Comstock. New York, The William T. Comstock Company. Price $2.00.

Popular Hand-Book for Cement and Concrete Users. Edited by Myron H. Lewis, C. E., and Albert H. Chandler, C. E. A reference book covering the uses of plain and reinforced concrete. New York, The Norman W. Henley Publishing Company. Price $2.50.

The Beautiful Necessity, a book of Architectural Essays by Claude Bragdon. The book presents, in amplified form, those ideas on the subject of Architectural Æsthetics first treated of in Mr. Bragdon's address entitled *Mysticism and Architecture*, delivered at the third annual convention of the Architectural League of America, in Philadelphia, and again in his address entitled *Self Education*, given before the Boston Architectural Club, April 3, 1909. $2.00. The Manas Press, Rochester, N. Y.

IN GENERAL.

Within a short time work will be started on three new high schools for San Francisco the total cost of which will be $1,300,000. Ground will first be broken for the new Lowell High School which will be built of brick and terra cotta, to accommodate forty rooms. The new Polytechnic High School to be erected will be a three-story brick and terra cotta building on a steel framework to include sixty rooms.

DETAIL FOR CONVENT.
Made by the Conkling-Armstrong Terra Cotta Company.
Charles R. Greco, Architect.

DETAIL OF TWENTY-FIVE FOOT ARCH OVER MAIN WINDOWS, VANDERBILT HOTEL, NEW YORK.
Executed in cream and white mat glazed faience by Hartford Faience Company.
Warren & Wetmore, Architects.

The University of Illinois announces a Fellowship in Architecture known as the Francis J. Plym Fellowship. The competition will be open to graduates of the Department of Architecture of that university. Full information may be obtained from Prof. Frederick M. Mann, Department of Architecture, University of Illinois, Urbana, Ill.

Charles Zeller Klauder has been admitted to the firm of Frank Miles Day and Brother, Philadelphia. The name of the newly constituted firm will be Day Brothers and Klauder.

D. J. Patterson, architect, has opened an office in the Mechanics Institute Building, San Francisco.

The Pfotenhauer-Nesbit Company of New York furnished Kittanning brick for the exterior of the new St. John's Church, Kingsbridge, New York, which is illustrated in this issue. Grueby Faience is also liberally employed in this building.

Robert C. Sweatt, architect of Spokane, Wash., has removed his offices to the Realty Building. Manufacturers' samples and catalogues desired.

The Soldan High School at St. Louis, William B. Ittner, architect, which was illustrated in The Brickbuilder for February, was through a mistake mentioned as being located in Chicago.

The Architectural Arts League of Atlanta, Ga., has formed an employment bureau, in order that draftsmen in that city may ascertain what vacancies exist in the various architectural offices. This feature is commendable in that it is a great saving of time and expense to the draftsmen and removes from the architects the constant annoyance of applicants. Architects will apply for assistance to the bureau, where a complete list of men and their abilities will be kept on file.

The panel over the main entrance of the Westwood School, Cincinnati, Ohio, was executed by The Rookwood Pottery Company, the color scheme of which is a rich brown, green and buff.

San Antonio, Texas, is to have a twelve-story church and office building. The basement and first two stories will be used for ecclesiastical purposes and the other floors for business. The structure when completed will cost approximately $1,000,000.

The Atlantic Terra Cotta Company furnished the architectural terra cotta used in the Westwood School, Cincinnati, Garber & Woodward, architects, and also for St. John's R. C. Church, Kingsbridge, New York, Davis, McGrath & Kiessling, architects. Both of these buildings are illustrated in this issue.

Architectural terra cotta for the following mentioned new buildings is being furnished by the Atlantic Terra Cotta Company: Third National Bank, Atlanta, Ga., W. T. Downing, Morgan E. Dillon and A. Ten Eyck Brown, associated, architects; Men's Dormitory, University of Wooster, Wooster, Ohio, L. C. Holden, architect; Church of the Sacred Heart, Taunton, Mass., Matthew Sullivan, architect; Imperial Life Building, Toronto, Canada, G. M. Miller & Co., architects.

The brick used in the construction of the New Carr School, New Humboldt School and New Lyon School at St. Louis, Mo., illustrated in this issue, was furnished by the Hydraulic-Press Brick Company of St. Louis.

THE BRICKBUILDER

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PLATE ILLUSTRATIONS

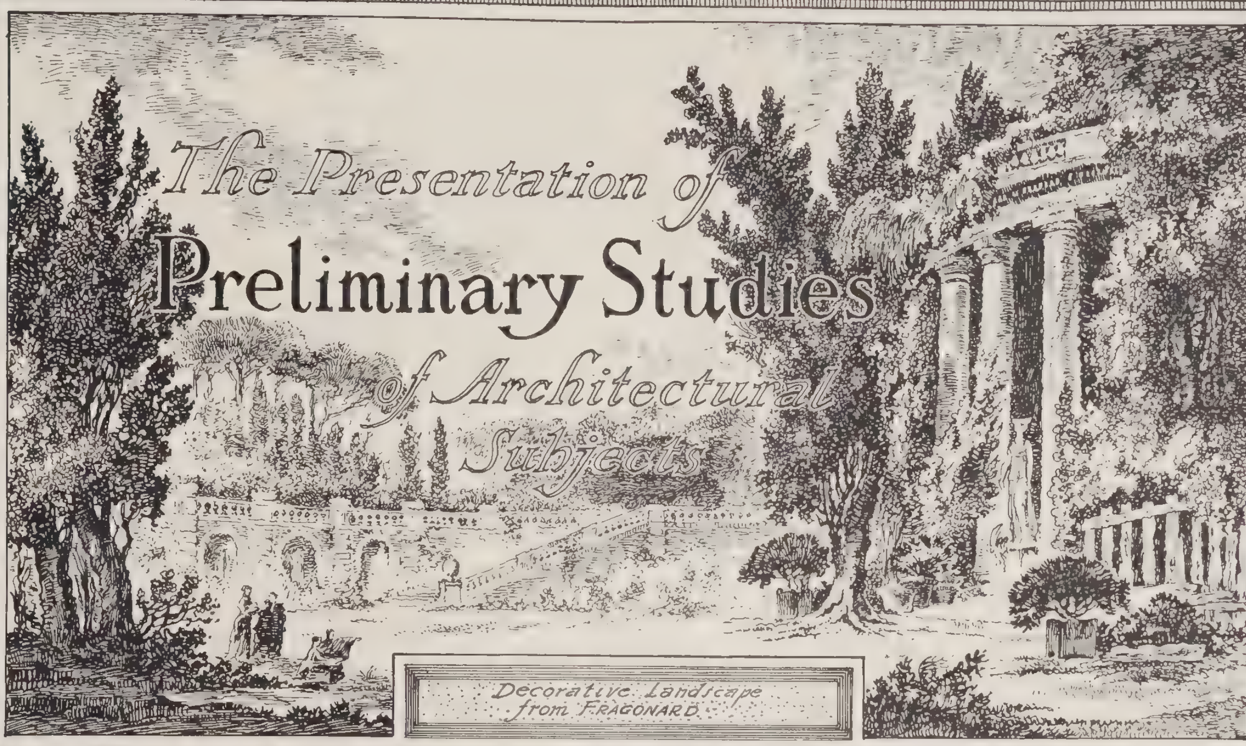
FROM WORK BY

WILLIAM A. BATES; LEON E. DESSEZ; FRANK B. MEADE; DWIGHT H. PERKINS.

LETTERPRESS

CHURCH DE LA COMPANIA
DE JESUS, PUEBLA, MEXICO.

Dome and top of lantern covered with blue and white glazed tile about four inches square. The wall in foreground is faced with red rough tiles.



IV. — *Concluded.*

BY HUBERT G. RIPLEY.

τοῦ ἔρωτος τοῦ Μιχαήλ ἕνεκα, ἴσθι ἐπιεικής.

—ROSETTA STONE.

ARCHITECTS and artists have had their vagaries in all ages, and the seapage from the writings of classic authors has indicated this unmistakably. It is often difficult to tell the pose from the reality, for as Mr. Newton says, those who have spent their time, not in their study, but in the world, habitually acquire confidence, and, while this confidence chiefly owes its success to the personal equation, the pose in the artistic equation (this must be dual equation previously referred to) whether it be "anapestic or choreic, measured in strophe or antistrophe, with monody and epode" has always held a peculiar charm for the cymbocephalic highbrows.

Michael, lord of Montaigne, in chapter XXVII of the first book of his essays says,

"Considering the proceeding of a Painter's worke I have; a desire possessed mee to imitate him: He maketh choice of the most convenient place and middle of everie wall, there to place a picture, laboured with all his skill and sufficiencie; and all void places about it he filleth up with antike Boscage or Crotesko works; which are fantasticall pictures, having no grace, but in the variety and strangenesse of them. And what are these my compositions in truth, other than antike workes, and monstrous bodies, patched and hudled up together of divers members, without any certaine or well ordered figure, having neither order, dependnencie, or proportion, but casuall and framed by chance?"

Aside from the spelling and punctuation this seems a fairly reasonable and timely statement of conditions that obtain among those writers who earn their living by selling blue prints. Mike, a little further along (The First Booke chap. LI) says

"But when I heare our Architects mouthout those big, and ratling words of *Pilasters*, *Architraves*, *Cornixes*, *Frontispices*, *Corinthian*, and *Dorike* works, and such like fustian-termes of theirs, I cannot let my wandering imagination frame a sodaine

FIG. XVI.

Carrefour des Amourettes, Rome. A pink paper was appropriately selected for this sketch, and its sheen illumines the tender hues of the pelouse. Little touches of body color here and there in the foreground and on the figures indicate sunshine; otherwise, transparent colors were used.

FIG. XVII.

This sketch, selected from Mr. Kidd's portfolio of drawings made while yet a student at the Atelier Demi-Tasse, was entirely finished in body color. Almost a whole tube of Horadams Chinese white, costing sixty cents, was used. In spite of this the colors are clear and lambent.

> apprehension of *Apollidonius* his pallace, and I find by effect, that they are the seely, and decayed peeces of my Kitchin-doore."

It would seem from this that the architects of the sixteenth century found as much difficulty in expressing themselves in simple straightforward language as they do now, and it may be that this is true of writers on other subjects as well. This goes to show that the "pons asinorum" and the "gradus ad Parnassum" are to be surmounted not by merely reading and dreaming over the works of the masters in dilettante fashion, but by hard manual labor with the T Square, triangles, pen, pencils, brushes, ink, colors and paper, and utter self abasement and fortitude under great stress; and the value of this enchiridion (if we may be pardoned the use of the word in speaking of so humble an instrument) depends for its justification on its insistence of thoroughness, concentration and self-restraint.

"In the old days" the average architect's library consisted of a copy of Batty Langley or Gwilt, half a dozen bound volumes of the architectural magazines, vintage of 1876, and Stearns' gutter-book. These were kept in the boss's private office and offered little temptation to the draughtsman to while away the tedious hours between 8.30 and 5.30. The jejune and musty ruling pen perspectives were not very exciting or thrilling and the only bright spots were the rambling sketches of good old T. Raffles Davidson. Now this is all changed, and almost every office possesses, in addition to Madeline and a branch private exchange telephone service, a choice and exotic collection of rare and costly art books with portfolios of photogravures, color prints, and photographs, and reproductions of drawings, envois, esquisses, rendus, etchings, lithographs, engravings and all manner of material that may be of possible assistance in working out any problem, from designing a tennis court to a fountain in the greenhouse, from writing the specifications for a vitrified terra-cotta corset factory, to selecting the draperies for the drawing-room of a malefactor of great wealth.

FIG. XVIII.

This study of a garden scene on the roof of one of our large hotels shows what can be done to brighten up our artificial city life and bring us all in closer touch with nature, and freedom from the trammels of art. Reckoned in terms of dollars and cents the construction is not really expensive and the hotel management says that the investment has already more than paid for its initial cost.

With such storehouses right at hand to draw upon, it seems presumptuous to attempt to add anything to the subject. There are, however, a few points that are not exhaustively covered, and on this bright, sunshiny, spring morning let us take up for consideration with a little more detail than we have previously done, the rendering of drawings in water-colors.

First the palette. Despite the impression that has been circulated to the contrary, the Romans had a very extensive palette that ranged from black to white and contained such colors as Ochrœ or sil, the Rubrica of Sinope, Pontus, and Lemnos, Prætorium, Melinium (both white earths), Theodotion, or green earth, Auripigmentum, Sandara (which must

not be confused with Sandarac), Cinnabar, Sinopis, Syricum, Chrysocolla, or gold solder; and in addition to these many factitious colors such as black, made from the lees of wine dried and burnt in a furnace (the better the wine the better the black) called Indicum Ceruleum and Usta, made from the glebe of good sil, Ceruse, a white lead (when burned this became red lead), Ostrum, which was the famous and celebrated purple of the ancients and was made from broken conchylia, Rubria and Hyginium, and a purple made of prepared vaccinium, milk and luteum and Silinusian earth, called Porpura, rich in its promise of dramatic contrasts, and fecund with the garnered haze of incense breathing morn.

Try some of these over on your typewriter, and you and your friends will be pleased with the result.

These colors all offer many useful suggestions for present day needs, being particularly valuable in describing a drawing. It sounds so much better for instance to say that your sketch is rendered in tones of Sandarac, and Marmorosum with a little Aerugo in the blacks, than to say that you used Indian Red for the roof and French Blue and Gamboge for the gazon. Another thing to keep in mind is to give the French names for the colors used even if the drawing is a monochrome. Don't say India Ink or Charcoal Gray; say Noir de Pêche and Grez de Fusan. Such shades as Honane, Taupe and Vervain (a word sometimes attributed to a perfume) are being used extensively this spring, and combine charmingly for distant foliage and soft dull tones.

While these colors may all be employed to advantage in their proper places, for everyday use we recommend the following palette, as containing all that is really essential; Horadams Chinese White, Peach Black, French Blue, or, if you can afford it, Smalt or Ultramarine, Prussian Blue (these two blues are quite necessary as they supplement each other) Aurora Yellow, Lemon Yellow, Yellow Carmine, Orange Vermillion, Carmine and Gallstone. Alazarin crimson may be used in place of carmine if a less expensive color is desired. To this should be added Bistre, making in all eleven tubes, which should be a sufficient equipment for every class of work.

If some take exception to this list let them add the Roman colors to the color box, and we feel sure that carping criticism will stand abashed, and the most exacting martinet falter and grow confused like a small boy who rises to speak his piece on graduation day. A shorter list even would be better as it is quite possible to do excellent work with but these colors — Cerulean Blue, Pale Orange Cadmium, and Japanese Red — but as each colorist has his or her own pet special color, no hard and fast rule can be laid down.

Second, the paper. We now begin to venture on thin ice and tread very delicate ground, to speak tautologically, as the average

FIG. XIX.

An example of Boscage and Crotesko work, a cyrtostyle abode of Dryad and Hylidæ. The andouille of the enclosing frame would serve equally well as entourage for another sketch than that shown and vice versa.

architectural illustrator is about as fussy over the kind of paper for a drawing, and uses as much care and thought in choosing it, as he does over the mixing and consuming of the hebdomidal cocktail. And this is rightly so, as the limitations and restrictions of architectural illustrations leave little to chance, all accidental effects must be taken advantage of, and the whole present a knowing and unlabored result. If a certain shade or texture of paper is selected that does away with the necessity for a wash to represent material, or effective use for a portion of the drawing can be made of the medium upon which you are working, the opportunity to commit mistakes and blunders is greatly lessened.

Probably more discussions have been held, acrimonious invective used, and life-long friendships shattered in extolling the virtues, or expatiating on the defects of rival brands of water color paper among the architectural illustrators, than any other one thing.

Many colorists always use white paper, but without wishing to go too far, and with all due respect and sincere admiration for the beautiful drawings that have appeared in the past, and that are yet to appear in the future, we venture to make a few suggestions that may fall on fallow soil.

Let the pencil outline be drawn with as much care as if it were to be rendered in that medium, even going to the extent of laying in shadows and foliage, and occasionally touching up here and there with pen and ink. This all goes to give texture to the various portions of the drawing, and form and texture are about as far as the architectural draughtsman can hope to carry a sketch.

Make this drawing on a tinted paper of a rather smooth surface, selecting a shade that is the prevailing color the drawing is to be. If trees predominate in the drawing, use a green charcoal or crayon paper that is not too strong in tone and is pleasing in shade, and that will étaler through the washes, here and there letting the actual color of the paper appear. If a large brick building is to be shown, use a light red or pink paper; if a limestone or plaster building, a gray paper, and so on. This means that body color will have to be extensively employed, but not so extensively as one might suppose.

The chief thing to bear in mind is to make the building "stand out" against the sky, not to merge gently into the landscape or be thin and aerial. The best way to make a sky transparent is to use opaque colors, and transparent colors properly handled give the effect of solidity. If the sky is to be blue, the one best blue for that purpose is Prussian blue (a very heavy, dark and deep, rich blue), mixed with Chinese white; this gives a beautiful clear color, which, when put on a tinted paper nice and thick and sticky, and graded and merged into violet or heliotrope near the horizon, dries out well and looks like a sky. If the building is then rendered lightly in transparent colors, with perhaps here and there a touch of creamy high lights, and some full deep blacks in the far shadows, these are the essential elements that go to make a successful drawing even without much labor or skill.

Portrait of O. U. Kidd, Esq., architect, from an old mezzotint by A. Brayton Butler, loaned through the courtesy of the Boston Architectural Club. This shows Mr. Kidd discovering the origin and inspiration of the Ionic cap, surrounded by a group of his favorite trophies. The necktie and the background are in grisaille and the foliage supporting the encadrement is the celebrated plumbaginoides diligens cartouchii or busy cartouche plant.

By successful we mean presentable from the architect's point of view and suitable for the purpose of illustrating his idea, and showing the client what he is up against. The majority of us cannot hope to cope with real artists and infuse atmosphere, chiaro-oscuro, tone and quality into our pictures; we should be satisfied with a graphic portrayal that does not pretend to be anything but what it is.

If the idea of using opaque colors is abhorrent to some, good clean drawings may be made on lightly tinted paper; but in this case, the texture of the paper is of prime importance, and it is better on the whole to stick to Whatman's, washing or staining the drawing before the colors are applied, as previously indicated. High lights may be taken out after the drawing is all done with an ink eraser, or put on with white conté crayon sparingly used, and well rubbed in.

In all drawings, as well as in architectural work of every character, too much stress and emphasis cannot be laid on the value of seriousness. The work is in a way permanent and may stand for centuries, and every step should be carefully and thoroughly scrutinized.

Seriousness is one of the chief assets of the successful architect, and his ability to impress on the public that this quality oozes from every pore is in direct ratio with the number and importance of his commissions. Where many a brilliant man falls down is in the mistake he makes in not taking himself seriously, and while his equipment and ability may exceed that of his fellow associates, his cash register sales and blue print bills will fall far below those of his less gifted compeers.

Cultivate this quality of seriousness in all stages of the work. Begin by trying it on yourself, and after a while it will be as easy to pick out the architect by his long hair and wrinkled brow, as to tell the doctor by his beard.

Cultivate also an individuality, either in style, or technique in rendering (and the possibilities here have by no means been exhausted), or the use of some well known material in an unexpected place, or an unheard of material in a well known place; something that has not been attempted before, or something that, having been done, has been forgotten. Let this pervade every stage of the work from the first rough sketch to "them skylight details," and let it be particularly insistent in the preliminary sketch. As Kallicrates used to say to his pupils "ἡ ἐλευθερία ἕνεκα τῆς τέχνης ἡ ἀπλότης ἔστι."

Polychrome Terra Cotta in Exterior Architecture.

BY J. MONROE HEWLETT.

AT a meeting of one of the art societies some years ago, a casual reference by one of the speakers to architects as "modelers of buildings" called forth a vigorous protest from Russell Sturgis at the slight recognition given by the general public, and by architects themselves, to the functions of the architect as a "colorer of buildings."

In spite of all we have learned from the archæologists as to the color treatment of their architecture by the Greeks; in spite of all that we have seen in Spain and Italy and all that Ruskin and others have said about it; in spite of the charming effects that have been produced both in ancient and modern times by combinations of brick and stone contrasting sharply in color, there is still an almost universal feeling that in its more monumental phases architecture, to attain the maximum of dignity, simplicity and grandeur, must be kept in a general uniformity of tone, and that that tone must be light enough in value to clearly define the light, shade and shadow of all the detailed forms, and maintain undiminished the sculpturesque quality universally associated with the greatest buildings. This habit of mind is one that should not be lightly departed from. It is easy to imagine the decadence in the art of sculpture that would result from giving predominance to questions of color over those of form, and a similar development in architecture would be no less disastrous, for it seems obvious that a distinct color variation in the masonry façade of a building is artistically defensible only when this variation is introduced in such a way as to define and emphasize definite characteristics of the composition which have already been developed in the study of form, or perhaps I might better say, of light and shade.

To those critics, professional and amateur, who are prone to regard recent architectural developments as the result of a feverish seeking after some new thing, as well as to those who charge our architects with a slavish adherence to threadbare precedent, the history of the development of polychrome terra cotta in this country should be enlightening as an illustration of gradual progress tempered by healthy conservatism.

In an Architectural League Exhibition, about fifteen years ago, a small store front of highly colored terra cotta erected against one wall of the Vanderbilt Gallery aroused general interest in that it represented about the first tentative effort to impress upon the architects and the public the possibilities of this interesting material for exterior design.

More than ten years later the Madison Square Presbyterian Church was begun, and this may be said to be the first notable example of the use of polychrome terra cotta throughout all portions of the exterior of an important building. During this interval and for some time previous there had been evident a steadily increasing interest in the texture and color of the various materials employed in the execution of exterior design, and a better understanding of the interrelation of color and texture. The soft gray tones of unpainted shingles, the interesting sparkle of rubble walls built of discolored and moss-grown field stone, the subtle suggestion of pattern due to the presence of black headers in rough brick walls with wide joints, all testified increasingly to the desire for color united with agreeable texture, and helped to make general an appreciation of the fact that strong color contrasts must be united with agreeable textural quality in order to be architecturally acceptable.

This period was rendered notable for the purposes of this discussion by the newly built Museum of the University of Pennsylvania, a building which perhaps illustrates better than any other example that we have how vigorously color contrasts may be used for the enrichment of our façades without destroying the necessary repose, by combining and surrounding them with carefully studied surface textures. Furthermore, as an example of the color effect that may be obtained by carefully studied surface texture without the introduction of any definite color treatment, we have the University Club of New York, a building, I believe, unequaled in this respect. As a preliminary, then, to the introduction of large masses of glazed and colored terra cotta upon the façades of buildings, public taste may be said to have developed to the point of realizing the futility of the effort to introduce color interest into architecture by such expedients as the introduction of panels of tile mosaic in the midst of great surfaces of the traditional Philadelphia brick, or other material equally uninteresting in texture, a characteristic of a certain period of our architecture which fortunately was a brief one.

I have referred above to the Madison Square Presbyterian Church as the first notable example in this country of the use of polychrome terra cotta in exterior design. In view of this fact and also of the prominence of the location of this building it is, I think, most fortunate that the color has been applied with great reserve — so much so, in fact, that to one observing this building from a sufficient distance to grasp the effect of the entire composition on a bright day the color variation merely serves to impart a slight vibrant golden glow to the prevailing creamy tone of the building without in the least diminishing the quietness of the shade and shadow; but on a gray, overcast day, when the building is seen in diffused light, the detailed interest of the color treatment immediately becomes apparent, and thus substitutes another and different kind of interest to compensate for the loss of the shadow forms. In this respect it seems to me that this building is deserving of the highest praise, and it is, I believe, destined to exercise a most salutary influence in restraining those whose fondness for color contrast might easily lead them to the other extreme.

Two other buildings have recently been completed which are of particular interest in this connection. In the Church of St. Ambrose in Brooklyn, a scheme of color contrasts far more brilliant than any of those employed in the Madison Square Church has been used with results thoroughly satisfactory as to color, but somewhat unfortunate as to texture, owing to the fact that the bonding of the brickwork of the several portions of

the façade has been varied to such an extent as to fail, it seems to me, in its legitimate function of adequately tying together and unifying these various portions of the façade.

Another example of great interest is the Brooklyn Academy of Music. This building, owing to its great expanse of wall surface, offers a particularly favorable opportunity for the concentration of color enrichment at certain significant spots, an opportunity that has been well utilized, particularly around the window and door openings. The importance of surrounding the strong red, blue and yellow glazes by fillets or bands of the prevailing tone of the building itself is, it seems to me, emphasized in the balustrade above the main cornice, where the failure to do this has caused the juxtaposed colors to merge together in such a way as to give to the entire balustrade a sort of purple sheen not quite in harmony with the clear definition of the color treatment below.

These and other interesting examples which we already have might well be dwelt upon in detail, but my object in this brief paper is not so much a critical survey of what has been done as a discussion of the tendencies to be encouraged and avoided in order that this interesting material may not, like so many others, enjoy a brief vogue quickly terminated by its own excess.

The fact should be constantly borne in mind that in the average modern building the color interest of the façade must be mainly dependent upon the window openings with their glass catching varying reflections of sky, earth and foliage, their painted sash and glimpses of curtains or other colored objects in the interior, and that unity and integrity of all the solid portions of the façade are of far greater importance in the general result than any added interest to be obtained from agreeable color contrasts. This consideration seems to limit the applicability of this class of design to the comparatively small number of buildings whose functions permit of extended wall space and a comparatively small area of window opening, and if it shall chance that this limitation be generally observed it will, I think, be in all respects fortunate.

A danger to the orderly development of exterior polychrome ornament arises from the high degree of efficiency to which the manufacturers have already attained. The great assortment of so-called "softly blending" colors available makes it possible for the designer to introduce color variation in such a way as to be comparatively inoffensive even though it contributes nothing to the character of the design. In this respect the present situation is similar to that of the arts of stained glass and mosaic since the introduction of "opalescent" glass. The baleful influence of this material is manifest in the majority of our churches and in many of our other buildings. It has enabled the ignorant designer to escape the natural results of his ignorance by distracting attention from the inadequacy of the design and concentrating it upon the beauty of the materials. We have need of all beautiful materials in the greatest possible variety, but I am convinced that the only safe method for those who would introduce color variations into their masonry façades is to study the design in a few strongly contrasting colors of great intensity. This method will result in the abandonment of color variation at many points where it is in no way necessary to the composition and will tend to concentrate the chromatic interest at the points where it has greatest significance. There is no quality that can so ill be spared from architecture as repose.

It is certainly not too much to say that terra cotta as a distinct element in modern architectural design has but recently come into its own, for it is only recently that its most distinguishing characteristic has been generally taken into practical account, and it has been shown by actual results that far from being merely a less expensive substitute for stone, it possesses along with the greatest durability, qualities and possibilities of texture and color treatment entirely different from and in certain respects far beyond those of any other material.

The entire history of architecture, or at least of those phases of it that are included in the evolution of the traditions upon which our modern methods of design are based, furnishes abundant evidence of the necessity of a transitional period of greater or less duration for the gradual assimilation of any new material, motif or detailed form which has permanently taken its place as characteristic of the work of any epoch. During the next few years we shall unquestionably see a decided increase in the use of polychrome brick and terra cotta; at the same time a general sentiment will be forming as to the suitability of these materials for exterior design. If this follows the course of most similar manifestations excessive indulgence will be succeeded by nausea and subsequent distaste. This would be unfortunate. The material possesses so much intrinsic merit as a medium of architectural expression, and the initial essays in its use have been so reserved and dignified in character that we have, I believe, good grounds for expecting a gradual, wholesome and beautiful development of its possibilities.

DETAIL OF TYMPANUM IN PEDIMENT, MADISON SQUARE CHURCH, NEW YORK CITY.
McKim, Mead & White, Architects.

MASONIC TEMPLE, BROOKLYN, N. Y.
LORD & HEWLETT AND PELL & CORBETT, ASSOCIATED, ARCHITECTS.

SUPPLEMENT
THE BRICKBUILDER,
APRIL 1911.

The Manual Training High School.—IV.

BY WILLIAM B. ITTNER.

HIGH SCHOOL, LAFAYETTE, INDIANA.

THE Lafayette High School recently placed under contract is designed to accommodate twelve hundred pupils. The building has a frontage of 240 feet with a depth of 170 feet.

The first floor level has been placed about 11 feet above the grade allowing full window surface to all the rooms on the ground floor.

The approach of the main entrance is by easy stages to the first or main floor. Entrances to the ground floor from the side streets are provided for the pupils. The necessary number of service entrances are also provided to the shops and boiler room.

Three well lighted stairways are provided and located with respect to rapid circulation as well as to minimize travel distance between the various parts of the building.

The stairways near the session rooms are double stairways so that some pupils may pass up one while others are coming down the other.

The main corridor is 18 feet wide, and the secondary corridors 10 feet wide, all receiving direct light.

SESSION ROOMS. Six session or study rooms are provided, each room being 30 by 62 feet, and seating one hundred and fifty pupils in single desks. All are unilaterally lighted and are convenient to the double stairways, locker rooms, toilets, etc. One of these rooms is to be used for music and public speaking.

CLASS ROOMS. The class or recitation rooms are all arranged for unilateral lighting and conveniently placed with respect to corridors and stairways. Each room will accommodate thirty-five pupils in single seats.

LABORATORIES. The laboratories are placed in the large corner rooms on the first and second floors. They are arranged for unilateral light, are planned to open en suite with the lecture rooms and are provided with instructors' rooms, dark rooms, etc. The lecture rooms will accommodate double classes (fifty pupils) and are arranged with amphitheaters. The biological laboratory has a conservatory in the bay window.

COMMERCIAL ROOMS. Three rooms on the ground floor are set aside for classes in bookkeeping and stenography. These rooms are unilaterally lighted, the bookkeeping room having the necessary floor space for the bank and business houses in the bay window.

FREE-HAND DRAWING AND ART GALLERY. Two class rooms are arranged for free-hand drawing and will have a northern light.

MECHANICAL DRAWING. One room is provided for mechanical drawing and is located near the group of shops.

MANUAL TRAINING. The Lafayette School being located in a university community will make no provision for iron work. Two manual training rooms are provided for woodworking, and three rooms for arts and crafts work. These rooms which are all located along the north, and convenient for getting in supplies, are of ample size to accommodate the classes and are top-lighted. Each group has its necessary storeroom, instructor's room, tool room, wash and locker room, etc.

DOMESTIC SCIENCE. The domestic science group includes a sewing room, a cooking room, a dining room, and a bedroom. All are conveniently located on the ground floor and are provided with store rooms, fitting room, etc.

NEW HIGH SCHOOL, LAFAYETTE, INDIANA.

LIBRARY. The library is located next to the office for convenience in supervision by a single attendant in the principal's office. It has stack capacity for twenty-five hundred volumes.

ADMINISTRATION ROOMS. The administration rooms consisting of a general office, principal's office, a storage vault, and storeroom are located on the first floor next to the main entrance.

Auditorium. The auditorium occupies the center of the building on the first floor the balcony of which is reached from the second floor corridors. It is provided with ample well located exits for rapid egress and is well lighted from the courts and by skylight. It will furnish comfortable seating for twelve hundred pupils, the stage seating one hundred.

Teachers' Rooms. Retiring or rest rooms for both pupils and teachers are provided.

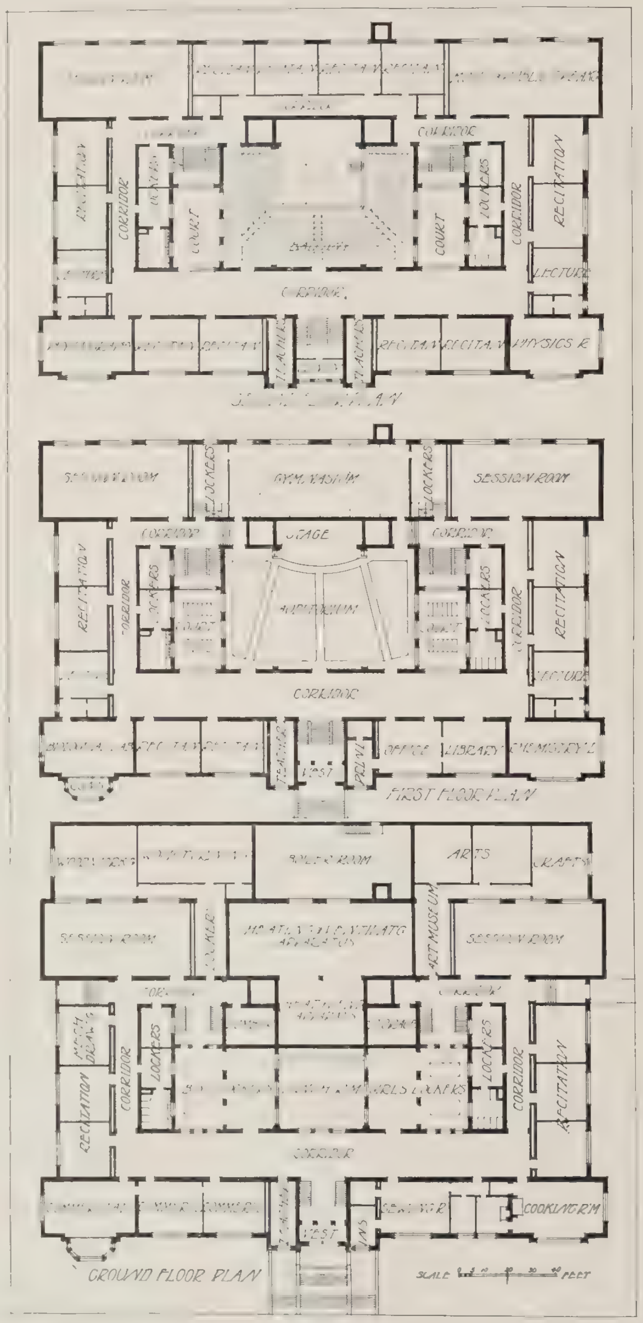
Gymnasium. A large well lighted gymnasium is provided with locker and shower rooms for both boys and girls.

Lunch Room. A small lunch room is located under the auditorium and is arranged with convenient serving counter.

Lockers and Toilets. The toilets which are arranged in stacks at convenient locations are well lighted and planned for proper privacy and supervision. The main locker rooms are located in well lighted rooms under the courts, while locker rooms for both boys and girls are arranged on each floor next the session rooms.

Heating and Ventilating. The building is arranged for the steam plenum system of heating and ventilating supplemented by direct radiation in the rooms, the air being washed before passing to the fans. The apparatus and the boilers are placed back of the main building. Ample fuel storage space is also provided.

Cost. The cost of the building which is of ordinary construction with fireproof corridors, stairways, and boiler room, ready for its equipment will be $212,000, which is at the rate of 13.5 cents per cubic foot, or $177 per capita for twelve hundred pupils.



PLANS OF NEW HIGH SCHOOL,
LAFAYETTE, INDIANA.

HIGH SCHOOL, WICHITA, KANSAS.

In the Wichita High School the session rooms have given way to combined class and study rooms of standard size seating fifty pupils each.

The building has a frontage of 228 feet on Emporia street with a depth of 125 feet on Third street. Owing to the limitations of the site this will leave about 15 feet on each of the street fronts, sufficient for a small terrace and planting area, and about 28 feet between the new and the old buildings to insure the proper natural lighting of both.

The boiler house is placed between the new building and the old with its roof below the level of the ground floor windows.

The first floor level has been fixed about 12 feet above the sidewalk grade which will allow full windows to all ground floor rooms and insure the proper lighting and dryness of the rooms on this floor.

The building is two stories high with the single exception of the art room which is placed over the north corridor, locker, and toilet rooms.

Four main entrances to the first and ground floors are provided together with three service entrances, two of which are available as emergency exits if required.

Four well lighted stairways are provided, located with respect to rapid circulation and to minimize travel distance between the various parts of the building.

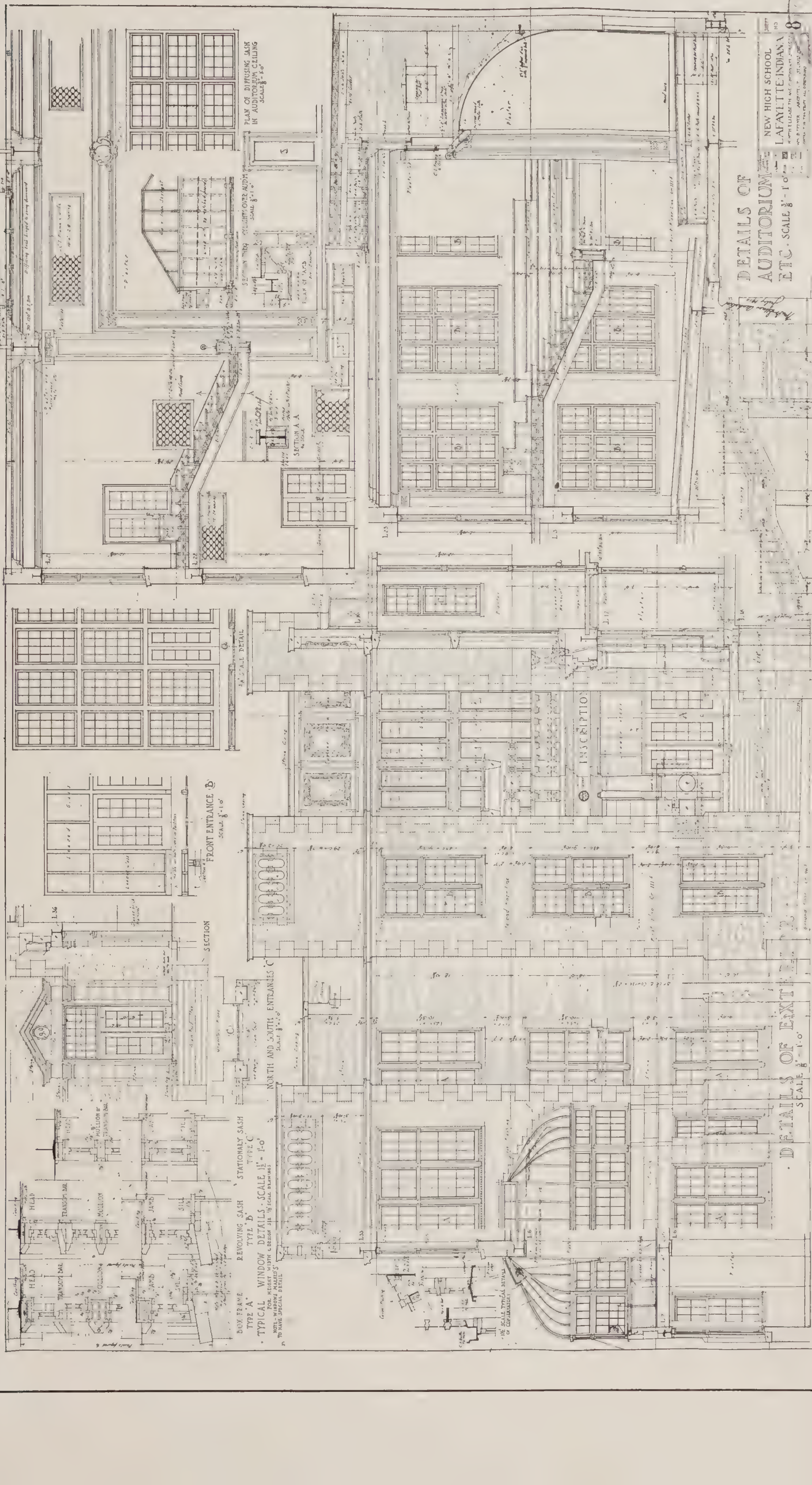
The main corridor is 15 feet wide and the secondary corridors 9 feet wide, which together with the convenient location of the stairways will enable rapid circulation without congestion.

Class Rooms. Twenty-five class rooms are located on the first and second floors. They are all arranged for unilateral lighting, conveniently placed with respect to corridor and stairways and will accommodate fifty pupils each in single seats.

Laboratories. The physics and chemistry laboratories are on the ground floor while the biology and physical geography laboratory is on the first floor. They are of generous size to accommodate the number required and are provided with instructors' laboratories and storage space. The physics and chemistry laboratories each have a dark room.

The lecture rooms opening off the laboratories and corridors are arranged for amphitheaters and will accommodate double classes.

Commercial Rooms. The commercial rooms on the ground floor will accommodate the classes in bookkeeping and stenography and are unilaterally lighted.



EXTERIOR AND INTERIOR DETAILS, NEW HIGH SCHOOL, LAFAYETTE, INDIANA.
William B. Ittner, Architect.

Free-Hand Drawing. The free-hand drawing room has been placed where it will receive north light through a toothed skylight. It is large enough to accommodate two classes, has an unbroken wall surface and ample store and instructors' rooms.

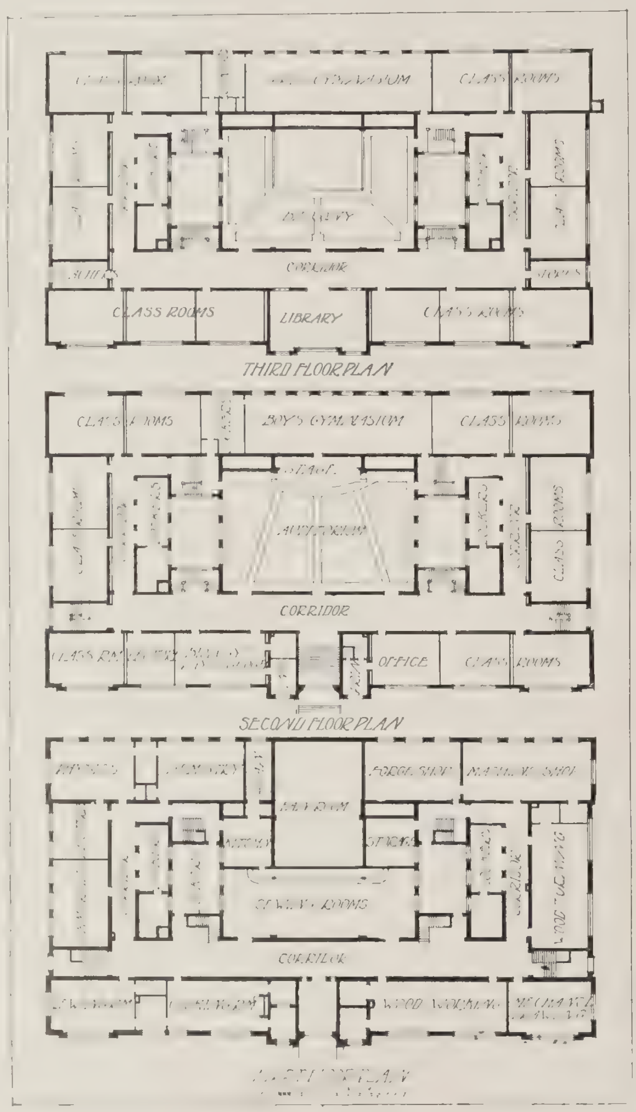
Manual Training. The five manual training rooms consisting of a woodworking, wood turning, forge, machine shop, and mechanical drawing room are located on the ground floor in the south wing. Each room is of adequate size to accommodate the classes and is well lighted. An instructor's room and the necessary tool rooms are provided as well as a large general storeroom, convenient to service door opening on the alley.

Domestic Science. The domestic science group is located on the ground floor in the north wing, consisting of a sewing and cooking room, each of generous size. The cooking room will have its range setting, model dining room and storeroom, while the sewing room will have a fitting room and storeroom.

Library. The library commands a central position on the second floor. This room is emphasized by fitting architectural treatment. It is especially well lighted, has floor space for fifty or sixty readers and possesses well lighted stacks capable of holding about five thousand volumes.

Administration Rooms. The administration rooms consisting of a general office, a private office with record vault, and a storeroom, are located on the first floor next the main entrance.

Assembly Hall. The assembly hall occupies the center of the building on the first floor, the balcony being reached from the second floor. The room is well lighted from the courts and overhead, and with its gallery will seat over twelve hundred. Ten exits are provided, five to each floor, thus insuring the rapid vacation of the room to the stairways, the various parts of the building, and the exterior exits.



PLANS OF HIGH SCHOOL, WICHITA, KANSAS.

Teachers' Rooms. Two teachers' rooms are provided on the second floor.

Gymnasia. Two gymnasia are provided, each room being 24 by 78 feet, with ample floor space for classes of fifty pupils and well lighted. The rooms are located so that the noise will not penetrate the class rooms and each is provided with ample lockers, showers, and toilet space.

Lunch Room. The lunch room, 28 by 80 feet, will accommodate about half the school at one lunch period. It has an ample kitchen and is arranged for rapid and convenient service.

Lockers and Toilets. The lockers and toilets are distributed in stacks on each floor. They are in well lighted groups and arranged for proper ventilation and supervision. The toilet rooms opening off the locker rooms give them proper privacy and convenience. On the boys' side ground floor wash trays for the shops have been placed.

Janitors. Lockers and toilets are conveniently located at the service entrance for janitors' use.

Heating and Ventilating. Ample space is provided for the heating and ventilating apparatus, the steam being carried from the boiler room thereto through an underground trench.

Cost. The school which is of ordinary construction with fireproof corridors and stairways, and isolated fireproof boiler room, will cost complete, ready for its equipment, about $175,000. This amount will make its cost per cubic foot 13.92 cents, and its per capita cost about $147, on the basis of twelve hundred pupils.

HIGH SCHOOL, SHELBYVILLE, INDIANA.

The High School at Shelbyville is typical of buildings for towns of moderate size, where the instruction in manual training must necessarily be limited to woodworking for the boys and cooking and sewing for the girls.

This building has a frontage of 149 feet with a depth of 104 feet. The site is 300 by 600 feet, and the building is placed on the central axis of the site with room for future extension and playground to the rear. It is two stories high above the ground floor which is level with the grade to insure proper sanitary conditions and light.

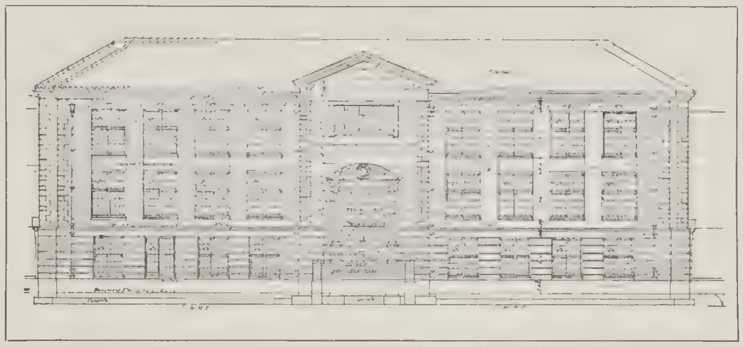
Class Rooms. The twelve class rooms are all arranged for unilateral lighting, are conveniently placed with respect to study hall, corridor, and stairways, and are the correct size to seat thirty pupils each in single desks. Each class room is provided with two bookcases and will have natural slate blackboards on three sides of the room.

Assembly Room or Study Hall. The assembly room or study hall is placed on the second floor in order to give

it the additional height necessary to insure its perfect lighting. It will seat two hundred and fifty pupils in single desks, or five hundred in opera chairs. The six exits afford every opportunity for rapid movement of classes.

LABORATORIES. The two laboratories are placed on the second floor with the lecture room between. The lecture room will have an amphitheater and is arranged for use from either laboratory or may be used independently.

GYMNASIUM. The gymnasium is placed on the ground floor convenient to the playground, together with several shower baths, toilets, and locker rooms.



NORTH ELEVATION, HIGH SCHOOL, SHELBYVILLE, INDIANA.

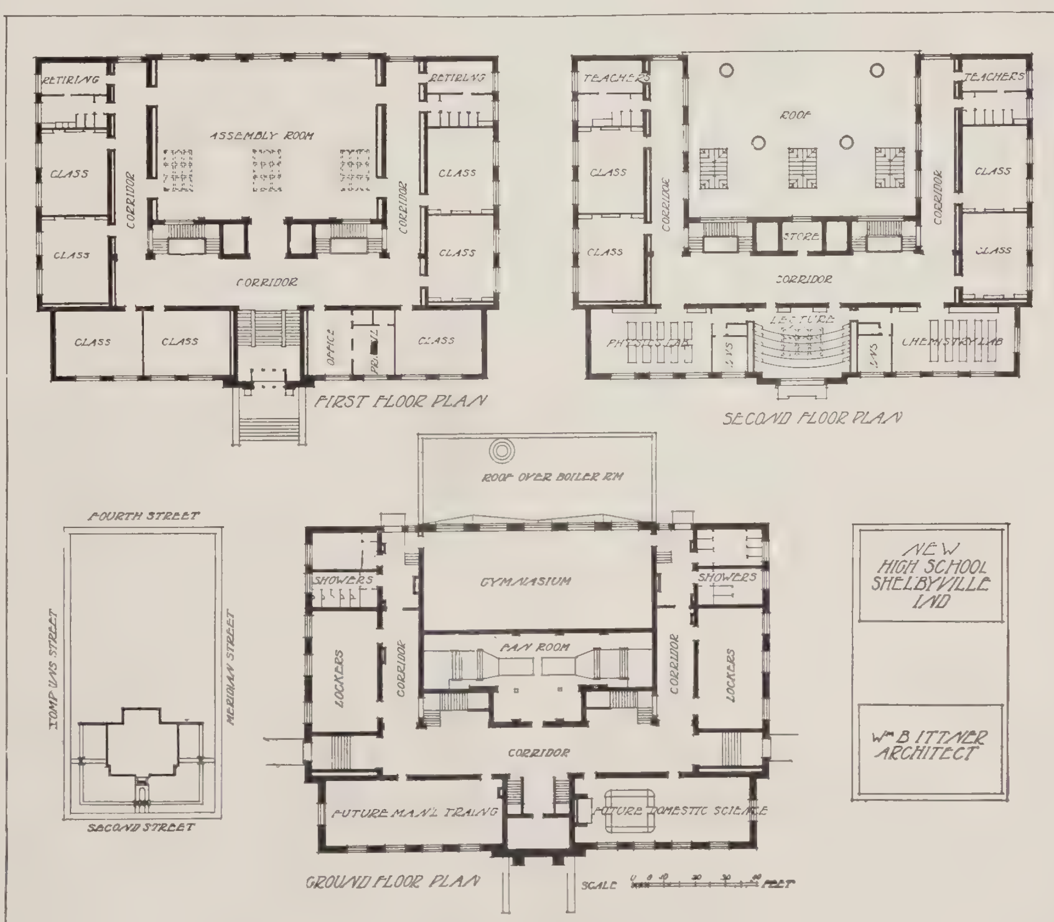
LOCKER ROOMS. Locker rooms for both boys and girls are located on the ground floor and accessible to the entrances, gymnasium, and future manual training rooms.

TOILETS. Toilets are placed on each floor convenient to the corridors and are well lighted and ventilated.

REST ROOMS. Rest rooms for both pupils and teachers are located on each floor next to the toilets.

ADMINISTRATION. The general office and principal's office are placed on the first floor and are provided with storeroom and vault.

MANUAL TRAINING ROOMS. Large rooms suitable for manual training and domestic science are provided on the ground floor.



PLANS OF HIGH SCHOOL, SHELBYVILLE, INDIANA.

HEATING AND VENTILATING. The building is heated and ventilated by the steam plenum system with the boiler room entirely outside of the building.

COST. The building is of ordinary construction with the exception of the corridors, stairways, and boiler room which are fireproof, and will cost about $102,000, giving a cubic cost of 13.4 cents.

HIGH SCHOOL, COLUMBIA, MISSOURI.

THE High School at Columbia, Missouri, is essentially a preparatory school for the University of Missouri as ninety-five per cent of its students enter the university. It also contains upper grade rooms together with high school and manual training rooms, a large study hall or assembly room and a gymnasium.

The building is three stories high with the first floor raised above grade to insure proper sanitary conditions.

The building contains, for the high school, a study hall or assembly room, 38 by 68 feet, two recitation rooms 24 by 21 feet, two 18 by 25 feet, and two 22 by 24 feet. In addition there are three laboratories each 22 by 36 feet, with a lecture room 21 by 22 feet, instructor's and storerooms, a small reference library and a principal's office.

The grammar school contains eight class rooms each 21 by 24 feet, equipped with single desks.

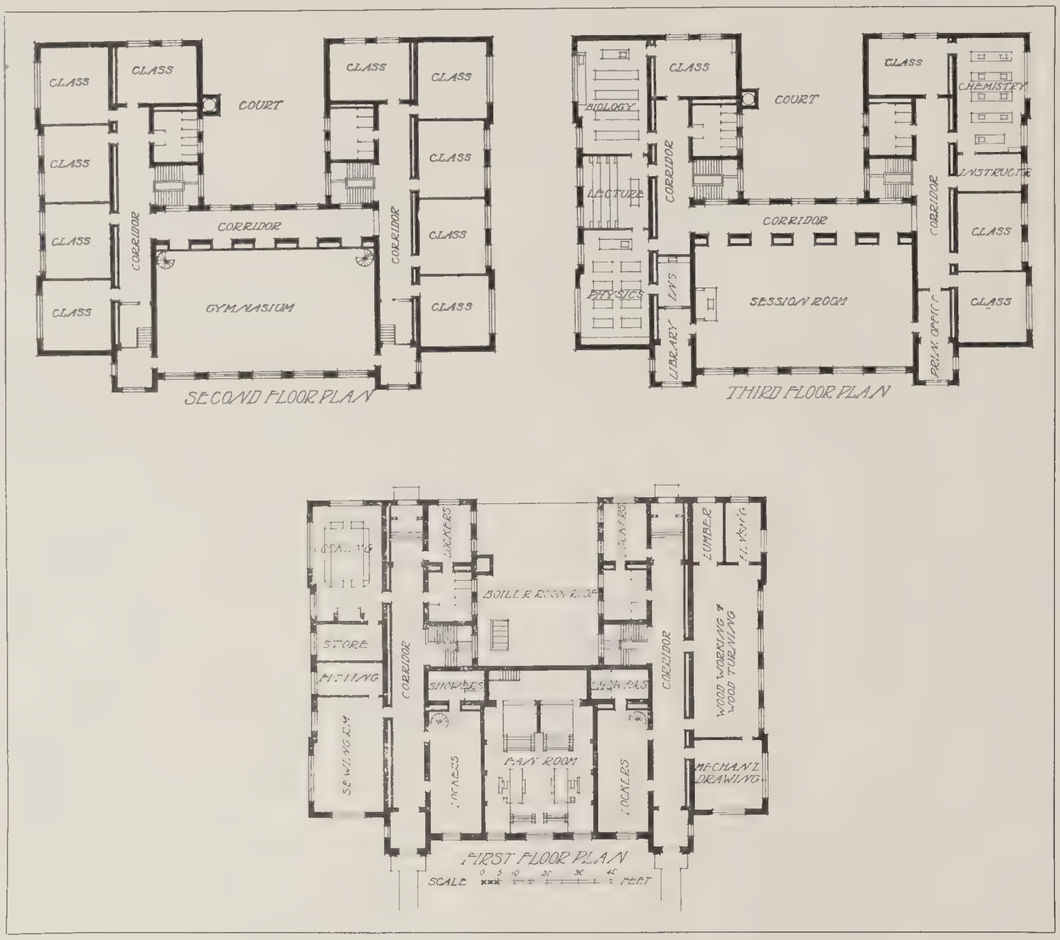
In addition to the above there is a gymnasium 38 by 68 feet, a cooking room 21 by 36 feet, and a sewing room 21 by 36 feet with store and fitting rooms between. Arrangement is also made for a woodworking room 20 by 52 feet, with lumber, storage, and finishing rooms, a mechanical drawing room, four locker rooms, general toilets for boys and girls, and the necessary space for the heating and ventilating plant.

The class and recitation rooms are arranged for unilateral lighting, provided with bookcases, and equipped with single desks.

The assembly room on account of its great width is given additional height in order to insure perfect lighting. It will seat three hundred pupils in single desks.

The laboratories are placed at the corners of the building on the third floor and are lighted from two sides. The lecture room, opening en suite with two of the laboratories, will have an amphitheater and is arranged for use from either laboratory, or may be used as a class room.

The library is placed so the teacher in charge of the assembly room will have supervision over it from her desk.



PLANS OF HIGH SCHOOL, COLUMBIA, MISSOURI.

Toilets are arranged on each floor and drinking fountains will be placed in the corridors.

The gymnasium has been given good height, the second floor corridor serving as a gallery thereto.

The necessary space is provided for the heating and ventilating system which is of the steam plenum type. The boilers are placed in the court and isolated from the remainder of the buildings.

Four entrances are provided, two on the front and two opening on the playground. The first floor toilets are so placed as to be readily accessible from the playground through the rear entrances.

The building is of ordinary joist construction with fireproof corridors and stairways, and will cost complete ready for its equipment, $101,000 or 16.35 cents per cubic foot.

HIGH SCHOOL, COLUMBIA, MISSOURI.

Polychrome Terra Cotta in the Masonic Temple of Brooklyn.

THE character of the Masonic Order and the purpose for which the Masonic Temple in Brooklyn was erected combined to give the architects an opportunity to adapt an ancient style of architecture in a somewhat original way to modern needs. The lines of the building are pure Greek Ionic, and its predominant characteristic is the liberal use of polychrome terra cotta.

The brick faces, while their integral parts show distinct variations in color values, at a short distance have a bronze monotone almost somber, contrasting with the lighter terra cotta colors and in harmony with the metal window gratings and roof cresting — altogether the color scheme is a distinct success and it is interesting to note the details.

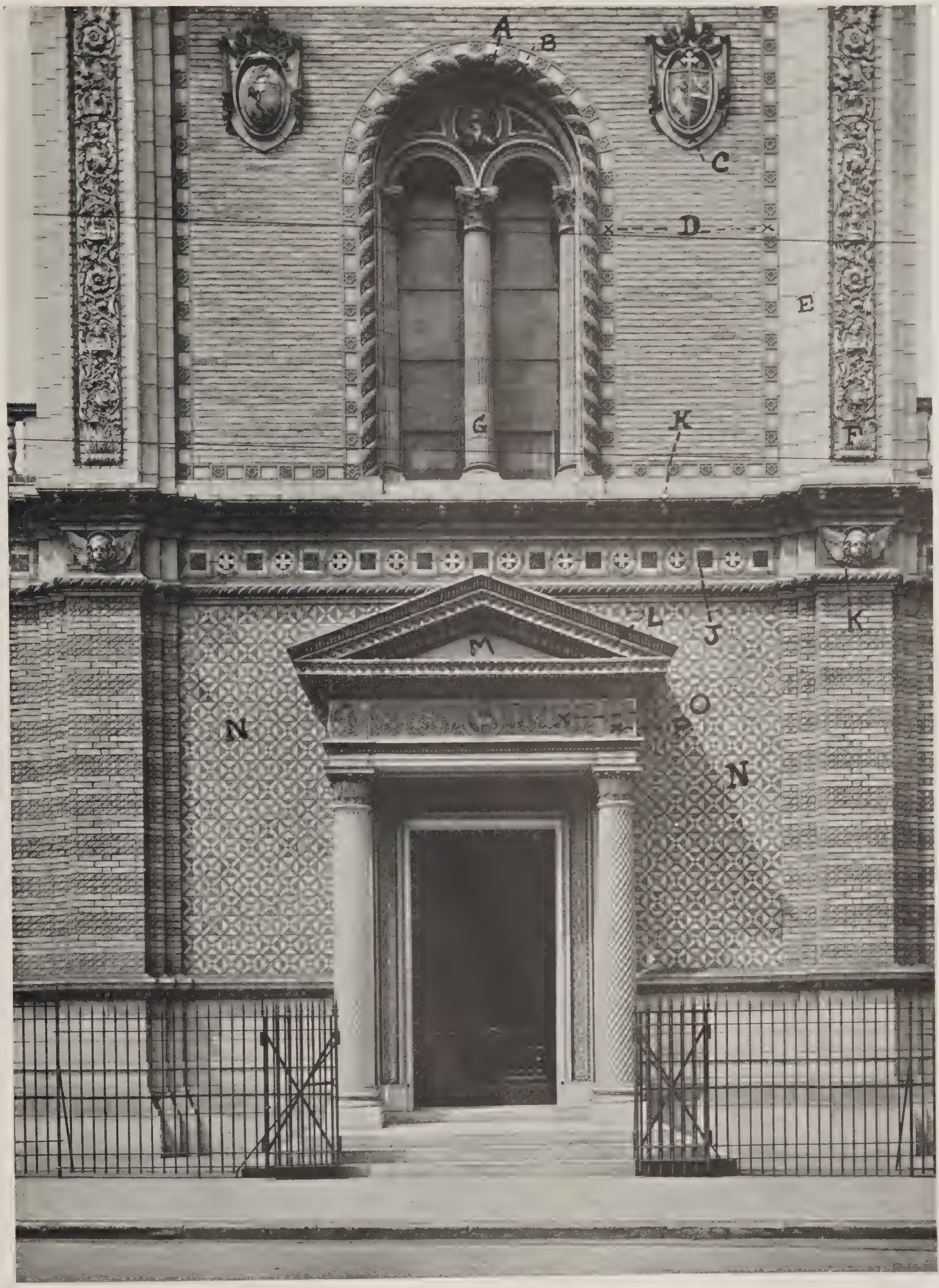
Beginning quietly at the base the colors gradually increase in strength and mass as they occur higher and higher from the ground. The plain marble base courses alternate with narrow courses of terra cotta; too narrow to apparently affect the solidity of the base, but sufficiently patent in their shades of cream and yellow to enliven the general tone and serve as a normal inception of the graduated scheme. Next comes a more decided course of yellow leaf modeling with dark blue background and panels of light green. The blue is too constricted in area to add individual color value; it is chiefly used to give the leaf modeling a sharper outline. This course clearly defines the base from the superstructure, and the two are further defined by the sharp contrast between the horizontal lines of the base and the vertical lines of the fluted Ionic columns. The vertical lines are further emphasized by the fact that the flutes are in yellow to supplement the natural shadow and create a stronger contrast with the cream. Other vertical lines occur in the delicate pilasters in cream white, clearly defined against the dark brick background.

SECTION OF CORNICE, MASONIC TEMPLE, BROOKLYN, N. Y.
LORD & HEWLETT AND PELL & CORBETT, ASSOCIATED, ARCHITECTS.
All except the brickwork in polychrome terra cotta.

These pilasters support the sub-entablature, and in this feature the more definite colors begin. Yellow and light green show prominently while blue and sienna are used more in the defining background. The corner panels, corresponding in position to the sub-entablature, are cream, green and blue with masonic emblem medallions

DETAIL, ACADEMY OF MUSIC, BROOKLYN, N. Y.
HERTS & TALLANT, ARCHITECTS.

BALUSTERS. — Old gold, sienna and green. PANELS. — Sienna, bordered with old gold, green and yellow. CORNICE. — Old gold, cream, blue, green and sienna. WINDOW. — A, cream and green; B, old gold, cream and green; C, cream, light blue and old gold; D, green and old gold; E, green, old gold and cream; F, green and old gold; G, green and old gold, colored marble inserts; H, green and sienna.



ST. AMBROSE CHURCH, BROOKLYN, N. Y.
GEORGE H. STREETON, ARCHITECT.

A, green, sienna, old gold, cream and yellow; B, cream, green and old gold; C, blue, cream and old gold; D, blue and cream; E, cream; F, cream and old gold; G, cream and yellow; H, old gold, green background; J, cream, sienna, yellow and green; K, cream bordered with sienna, green and old gold; L, cream, old gold, sienna, green and blue; M, cream; N, cream and yellow; O, cream on old gold; P, cream with blue background.

INTERIOR, ST. FRANCIS DE SALES CHURCH, PHILADELPHIA, PA.
HENRY D. DAGIT, ARCHITECT.
All ornament in polychrome terra cotta.

in sienna and yellow. In the Ionic capitals the colors are yellow, green, blue and sienna.

The construction method of the large columns is of particular interest because it has never before been employed, although unusually well adapted to architectural terra cotta. Owing to the high temperature at which terra cotta is burnt in the process of manufacture slight warping is apt to occur and large pieces are peculiarly liable to uneven shrinkage. It is of course absolutely necessary that the separate pieces should fit exactly or the continuity of the courses is broken. When medium size pieces are made, although the courses may take up well, the joints are apt to interfere with the monolithic impression so desirable in a large column. In a smaller column involving fewer joints the effect would not be impaired. The architects in this instance successfully obviated the difficulties by going to the other extreme. The column shafts are made up of countless small pieces of terra cotta, and the numerous joints — by their very number, and because partially obscured by the natural shadow and the darker color of the flutes — are practically imperceptible at even a very short distance. The resultant impression is all that could be desired.

The architrave consists of a base course of solid cream white of sufficient height to define the recommencement of horizontal lines. In the soffit cream predominates in the central panels marked by a narrow marginal modeling in yellow, blue and green. The reel and spindle and the unconventional egg and dart moulding in cream, blue, yellow and green are superimposed by a narrow course in cream, and in the panels of the frieze the strongest colors occur. The modeling of the panels is on a large scale so that the blue of the background and the yellow figure are easily distinguished, bringing out the full value of each color. The central medallions alternate in green and sienna. The dental course in cream and sienna, and the conventional egg and dart in yellow and green — of the cornice bed moulding — are shadowed by the crown moulding. The bracket soffits of the cornice are cream and green, and the intervening panels cream, blue and green. The plane face of the crown moulding is cream, topped by unconventional egg and dart in cream, blue, yellow and green. The honeysuckle modeling is in cream, yellow and green.

Above the cornice the brick faces are relieved with terra cotta belt courses and coping in cream. The lower windows are framed in terra cotta of the same color, and the upper tier in very dark header brick. The bronze roof cresting finishes the building harmoniously and decidedly in solid dark color, saved from heaviness by the delicate cheneaux.

It will be noticed that the dark blue, and generally the sienna, have been used more to bring out the livelier colors than to add their own values. The alternate frieze medallions in sienna are the exception to the rule. The life and light occur in the cream, green and yellow.

It takes the nicest kind of judgment to graduate the colors in a building evenly — their value is dependent upon so many circumstances. The ornament largely determines the area to be covered and must be designed accordingly. The brick, metal and other contrasting elements are all factors in emphasizing, modifying or nullifying the colors, and must be considered accordingly. Again, it is impossible to foresee beyond an uncertain limit what the effect of various colors will be when set in a building at varying distances from the ground. Combining the colors for harmony, strange to say, is not one of the most difficult problems. There is a quality about ceramic colors of good texture which makes them harmonize almost as freely as the colors of nature. For example, the combination of green and yellow in polychrome terra cotta is as harmonious as the green leaf and yellow flower of a jonquil!

In the construction and decoration of buildings it should be borne in mind that properly made architectural terra cotta is impervious and that the colors are subject to the but slight alteration due to the accumulation of dust, and that dust is easily removed. Therefore, if the entire building is not of terra cotta, the effect of weathering on the materials employed becomes an important consideration.

In the present instance every phase of polychrome treatment, artistic and practical, received the most careful, detailed study. In consequence, the Masonic Temple of Brooklyn is not only eminent among the homes of the Order throughout the world, but is of scarcely less note as an excellent example of a recently rejuvenated style of architecture.

The Ceramic Chemical Development of Architectural Terra Cotta.

BY HERMAN A. PLUSCH.

PERHAPS to many it will seem inconsistent, even strange, that terra cotta color — that peculiar, rather unsightly reddish buff — is one of the few colors that the manufacturers of architectural terra cotta do not make. It flourished for a while thirty years ago, and will continue to be found in many buildings of that period until they are torn down to make way for more modern structures, built — very probably — of more modern terra cotta. Imagine, for instance, a small four story building of brick, with sills, a belt course and cornice of terra cotta, terra cotta color, standing on the corner of Liberty and Nassau streets, New York, thirty odd years ago. Go down there to-day, and see the Liberty Tower entirely of dull soft cream colored glazed terra cotta for thirty-two sheer stories! That is the epitome of architectural terra cotta.

The fact that terra cotta was developed to such a high state several centuries ago, makes it strange that the art of making it should have been so entirely lost until its recent regeneration. The Della Robbias brought glazed terra cotta to great efficiency in their time; "Della Robbia blue" is far better known than "terra cotta

color," and yet it is true terra cotta. Perhaps the artistic worth of the modeling of the Della Robbias will never be equaled, but the possibilities are not as limited to-day as they were then. Modern methods have brought it in color possibilities and structural efficiency to a higher plane than terra cotta ever attained in its "former existence," but it had to be developed again from the beginning.

The early examples of modern times depended entirely upon the natural burnt clay colors, and the typical terra cotta shade was due to the fact that a large amount of red clay was used in the composition. Terra cotta was first generally used for the decorative features of buildings in connection with brick, for at that time it had not reached its present state of mechanical accuracy. Its natural colors suited the brick of lighter shades, and by increasing the amount of red clay used it could be made harmonious with the darker colors. The New York Produce Exchange exemplifies the early use of terra cotta.

With the introduction of buff brick the manufacturers were called upon for a wider range of color, and in the Madison Square Garden and the Herald Building the terra cotta was made almost entirely of buff burning clays.

Up to this point the terra cotta had been the same color all the way through, but its increasing use in a structural way — as opposed to a purely decorative medium — gave rise to a new development. The clays that gave the most accurate mechanical result were used constantly, and the color was obtained by spraying or coating the body before burning with a mixture of clay of the proper color and water. In firing the body and the color became thoroughly incorporated. Very simple, rule of thumb chemistry, this.

It was the demand for a white terra cotta that first necessitated true chemical knowledge, and required the services of a trained ceramic chemist. No white burning clay could be found that would adhere permanently to the body and give a smooth satisfactory surface. Even the ceramic chemist had no knowledge that could be directly applied, but his fundamental training enabled him to experiment along the right lines. Rapidly his work became indispensable to the manufacturer, and the chemical department is an established feature to-day in every terra cotta factory.

By this time architectural terra cotta was being widely used and demands were made upon the manufacturers to match every known form of marble, limestone, sandstone and granite. Two undesirable results were soon apparent:—

First, experiments were made to match certain colors, and an untried sample, perhaps from a small experimental kiln, would be approved. The order would be rushed through and placed in large kilns. Two weeks later when the kiln doors were taken down the terra cotta might come out an entirely different shade from the accepted sample. The cause for such a change is mass action in the kiln, producing under high temperature chemical reactions beyond control. Indirectly, it was because the architect was too anxious to have a new color, and the manufacturer would take unwise chances to supply it. Frequently the material — off color as it was — would have to be used at the building to fulfil the time clause of the contract. Increased knowledge — and caution — has practically eliminated this trouble.

The other disadvantage was due to directly opposite causes. Matching marble, limestone and granite induced people to use terra cotta as a substitute, and, consequently, a widespread impression was created that it was an imitation stone; it was used as stone and its peculiar properties were overlooked. It is astonishing that even to-day, when architectural terra cotta is so widely used, comparatively few people know what it really is. For example, how many out of the thousands that pass the Liberty Tower daily realize that thirty-two stories are entirely of terra cotta?

Partly it is the possibility for flexible modeling that has been active in raising architectural terra cotta out of its false position in the imitative class. There is a well recognized character to modeling in a clay material that can never be attained in a medium that requires the chisel, and yet it is as adaptable to crude, impressionistic treatment as it is to the graceful, finished detail of Renaissance design. It was the development of colored glazes, however, that finally and conclusively placed architectural terra cotta in a distinctive class by itself.

At their inception the color slips were no more impervious than the body, and the material would gradually tone down to some extent with the accumulated dust. Soon, however, the impervious, vitrified slips were instituted, absolutely weatherproof; and then, in logical sequence, the glazed material. Glazes are complex chemical combinations and the best technical knowledge is necessary not only to produce the glazes, but to incorporate them with, and to adjust their fusion points and expansion coefficients to the clay body.

The first white glazes produced were bright, and for several years when a dull finish was desired the bright surface would be cut by sand-blasting. It took time for the chemist to develop the dull impervious surface in general use to-day, but "mat" glaze has proved by far the most popular terra cotta ever produced. The bright glaze still holds its own in notably smoky cities because it keeps clean longer and is more easily washed down than any other material.

With the first successful glazes a new and unlimited field, polychrome, was opened to the manufacturer; the most complicated and difficult, and at the same time the most interesting, phase of terra cotta. It is a significant fact that polychrome was first employed by McKim, Mead & White, on the Madison Square Church, New York.

Mr. White's selection of old gold and green for the cornice happened to be a matter of moment to the manufacturer. The original selection was a golden yellow and a bright green, both of which had proved perfectly reliable in different kiln burnings. Several kilns of the two colors together were filled before the first came out and it was found that only a slight indication of the yellow selected could be seen on the very high lights of the ornament, and that the shade deepened until almost brown at its meeting with the green. The factory im-

mediately sent for Mr. White, who luckily was delighted with the accidental effect. The change was due to vaporization of the green glaze in the burning, the gases affecting the yellow and altering the expected reaction. Though it can be corrected, the combination has since been used to advantage frequently, notably on the St. Ambrose Church in Brooklyn.

Mr. George H. Streeton used color with less conservatism than Mr. White and on the St. Ambrose Church in some cases used exact Della Robbia duplicates. By boldness of color a striking effect was obtained without the aid of a striking design, such as that of the Madison Square Church, and yet the result is not in the least bizarre but thoroughly in keeping with the spirit of ecclesiastical architecture.

The Brooklyn Academy of Music, by Herts & Tallant, represents a lavish use of color and more originality, such as the character of the building would naturally allow. Again the old gold and green appear on the façade. The singing and playing cherubs, cream against yellow, in bold relief around the main entrance have been aptly called "Modern Della Robbias."

One of the most recent important examples of the exterior use of polychrome is the Masonic Temple, also in Brooklyn, by Lord & Hewlett and Pell & Corbett, Associated. This building was planned from the beginning for polychrome terra cotta, and aided by the experiences of others, backed by their own ideas, and the further development of the material, the architects produced a result that is certainly most successful.

An interesting example of interior decoration is the St. Francis de Sales Church, in Philadelphia, Henry D. Dagit, architect. The style is an adapted combination of the Byzantine and Romanesque. The colors are very brilliant but in the mellow light of the stained glass windows the tone is softened and the result restful.

The problems which faced the manufacturer at first in the production of polychrome were many and varied. The terra cotta body used for the Madison Square Church was chiefly composed of clays with a tendency to warp slightly. This was in direct accordance with Mr. White's wishes. In fact, he once caused a course to be reset because it was too exact mechanically to be in harmony with the crude form of brick used. The compactness and partial vitrification of the terra cotta body made the application of the glaze so that there would be no crazing a difficult matter, but a successful method to obviate this trouble was devised. The method of application was by brush, apt to result in too mechanical an effect, but softened by quiet colors and graceful modeling.

On both the Madison Square Church and the St. Ambrose Church the effect of the background color on some features was in part lost, either because the shadow cast by the ornament was darker than the color, or because the background space was too small to be noticeable. Dark colors are frequently used, however, to accentuate modeling in low relief, rather than to lend their own color tone.

On the Academy of Music and the Masonic Temple in Brooklyn, broad fields were allowed for the color so that the distance from the ground would not destroy the polychromatic effect — and that is a very important point to be kept in mind when designing for color. A straight burning body was used for these buildings.

Architects occasionally insist in their specifications for terra cotta that there must be "no variation of color." As a matter of fact there seldom is any true variation of color, but it frequently occurs that there is a slight difference of tone between two pieces. It is next to impossible to avoid this because the color is fixed on the material, and the fusion and solidification of slip and glaze take place at a temperature approximating 2300° F. The brick manufacturers sort for color, but it is impossible to do this with terra cotta when each piece occupies its particular place in the building and its accidental place in the kiln. The variation in terra cotta is no greater than the variation which occurs naturally in any other structural material, and generally the architects realize that slight variation gives light and life to the façade of a building. In fact, many of the architects insist upon variation because modeled work when the color is flat and even is apt to give an effect of pressed metal. On the New York University Club, McKim, Mead & White had the stone tooled with three different cuts, and set some of the stone so that the tooled lines would be vertical, while the stone next to it might have different tooling, running horizontally. Carrère & Hastings for the New York Library selected the stone with the greatest care to insure variation. Of course, architects should not accept pieces of terra cotta that are very decidedly off color, but a small amount of variation is not only inevitable but desirable.

With all the rapid development of the Twentieth Century, terra cotta is just beginning to surpass the point reached by the Egyptians and Assyrians, and the early Moors and Italians. Glazed terra cotta has been in existence, unimpaired, since 3000 B.C. and yet there are some who doubt its durability. There is nothing about terra cotta to decay; nothing that can be acted upon by acids or alkalis. Weather cannot affect it because the slip or glaze makes it impervious, and it stands fire because fire made it.

Harmony in color is what is most effective, and from the progress made in terra cotta during the last five years alone, one can conjecture optimistically regarding its future.

KAISER AS A TILEMAKER: the success of the German Emperor as a manufacturer of glazed tile on his estate at Kadinen has been so marked that he has found it necessary to have the plant enlarged. The work on the additional equipment is now nearly completed and will go into operation early in May. The great demand for glazed tile has led the Emperor to consider more than ever the harmonious effects of the various colors and bring this material to its highest efficiency in a structural sense. The stations of a new line of the Berlin Underground Railway, completed several years ago, are among the more important examples of buildings which are ornamented with tile from the Emperor's plant.

Editorial Comment and Miscellany.

PLATE ILLUSTRATIONS — DESCRIPTION.

Grover Cleveland Elementary School, Chicago, Ill. Plates 43, 44. This building is treated in a rough wire cut texture brick with the base in grey brick and all above in buff. The mortar joints are very wide, scraped off flush with the brick and of the same color. The plan is arranged for the purpose of elementary school instruction, with a large number of rooms having a maximum window area for light. The assembly hall is centrally located on the second floor with special entrances to it from the ground floor for the public. The children have direct access to the stage. There is no basement, the first floor being on the ground level. The manual training, domestic science, construction work and drawing are provided for in the ordinary class room units. The corridor extends from one end to the other through the center with four ample staircases, one at each end and two at intermediate points, which afford the greatest facility for egress in time of panic or for the ordinary transfer of classes. The plans provide for twenty-six rooms in addition to the assembly hall and gymnasium, and will accommodate 1,300 pupils. The building is entirely fireproof and cost approximately $240,000.

ENTRANCE TO KENNEDY BUILDING, OMAHA, NEB.
Executed in terra cotta by the St. Louis Terra Cotta Company.
Fisher and Lawrie, Architects.

Carl Schurz High School, Chicago, Ill. Plates 45–47. The exterior of this building is executed with large speckled buff brick in the lower stories and a purplish-brown brick in the upper stories. The roof is of tile. The plan shows an example of a modern cosmopolitan high school for both boys and girls. Provision is made for the usual classical and English courses, in addition to the vocational work and manual training. Shops for wood working, wood turning, foundry and forge work have been arranged for the boys. For the girls there is the usual cooking and sewing equipment connected with an apartment reproducing the rooms of a house with instruction for the design and care of same. There is also laundry work, textile weaving and dyeing included in the girls' department. Back of these departments and arranged with special reference to them are the mechanical and free-hand drawing rooms with an extra amount of space and equipment. The fourth floor provides for a professional studio and drafting room. The building, which is fireproof throughout, accommodates 1,000 pupils and cost approximately $425,000.

Engine House No. 2, Washington, D. C. Plates 55, 56. The exterior of this building is treated in "Tapestry" brick with the predominate color a dark red verging into brown and purple shades. The ornamental panels and mouldings of the cornice are of terra cotta, the arches of the doors and the sill courses are of stone, while the vestibule arches are of tile. The cost of the building was $39,240, which gives an approximate cost per cubic foot of $17\frac{6}{10}$ cents.

DISASTROUS FIRES IN LOFTS AND FACTORIES.

THE recent shirtwaist factory fire in Washington Place, New York City, has brought forth not only some merciless criticism as to the causes of such calamities, but also some excellent means for lessening the possibilities of such disasters in the future.

In Germany the skyscraper type of building is being widely condemned as largely responsible for the recent

DETAIL OF Y. M. C. A. BUILDING, CAMBRIDGE, MASS.
Executed in polychrome terra cotta by the Atlantic Terra Cotta Company.
Newhall and Blevins, Architects.

catastrophe. The newspapers are filled with communications and editorial articles decrying tall buildings and warning the Berlin municipal authorities to continue their opposition to the introduction of what, in German idiom, are called "cloud scratchers."

ANNEX TO Y. M. C. A. BUILDING, LEAGUE ISLAND, PHILADELPHIA, PA.
Exterior walls constructed of 16 inch "Natco" Hollow Tile and terrace walls of 12 inch "Natco" Hollow Tile, furnished by the National Fire Proofing Company.
A. M. Adams, Architect.

Herr Reichell, Chief of the Berlin Fire Department, in discussing the Washington Place horror points out that a disaster of such magnitude is practically excluded in Germany because of the relentlessly rigid building and inspection laws, which are not only enacted but enforced in that country. In the German cities the Fire Departments are clothed with the "even more important function of seeing that the buildings are genuinely fireproof." Extension ladders and elevators are useless when fires break out in skyscrapers, according to Herr Reichell, who thinks that the only trustworthy precautionary arrangements in such structures are balconies at every floor with substantial steps leading to the street.

DETAIL FOR WAR COLLEGE AT WASHINGTON, D. C.
Made by Brick, Terra Cotta & Tile Company.
Capt. John Stephen Sewall, Engineer in Charge.

William A. Boring, President of the Architectural League, New York City, in discussing the shirtwaist factory fire, says, that one means of lessening the possibility of such disasters in the future would be a curtailment of the room space for the use or storage of inflammable material. He thinks that the large floor space might be cut up into smaller rooms protected by fireproof double partitions of wire glass, leaving air space between them. This would make it possible to watch all operations going on in the smaller rooms, and in case of fire it could be confined to one spot for an appreciable length of time so that the blaze would not sweep through the entire establishment with such rapidity as to create panic and endanger lives. Mr. Boring also believes that the installing of automatic sprinklers and automatic doors would give a mechanical arrangement, so that the human element — the necessity of quick thinking to do the right thing — would be minimized. He further suggests the advisability of enacting regulations whereby workers in big loft buildings should not be placed beyond a certain distance from the means of escape. He does not favor the unprotected fire escapes, but thinks the exterior enclosed stairways are the safest and most reliable.

DETAIL FOR SCHOOLHOUSE.
Made by Winkle Terra Cotta Company.
J. Walter Stevens, Architect.

GYMNASIUM AT BELOIT COLLEGE, BELOIT, WIS.
Roofed with Ludowici-Celadon tiles.
Patton & Miller, Architects.

LINCOLN MEMORIAL SITE.

THE Lincoln Memorial Commission, created by the last Congress, held its first meeting at the White House recently. It decided to request the

DETAIL BY SCHMIDT, GARDEN AND MARTIN, ARCHITECTS.
Made by The American Terra Cotta & Ceramic Company.

National Fine Arts Commission to suggest various plans for the proposed memorial to be erected in this city to Abraham Lincoln, also to select three or four sites in the National capital which would be most appropriate for the plans submitted by them. The amount granted by Congress for the memorial was $2,000,000. All the members of the commission were present at the meeting, namely, President Taft, Senators Cullom, Wetmore and Money, and Representatives Cannon, Clark and McCall.

CASTLE OF KERJEAN.

THE ruined Château of Kerjean which has just been purchased by the French Government stands in the middle of the Department of Finistere and is one of the best specimens of sixteenth century Breton architecture, uniting as it does the elegance of the second period of the Renaissance with the more ancient imposing majesty of feudal times. The Minister of Fine Arts has decided to turn the castle into a museum and library, where all branches of Breton art and literature will be represented.

ENTRANCE TO KINGSBURY TERRACE, ST. LOUIS, MO.
Executed in dark red "Mat" brick, furnished by the Hydraulic-Press Brick Company.
Wilbur T. Trueblood, Architect.

ARCHÆOLOGICAL EXHIBITION AT THE BATHS OF DIOCLETIAN.

THE Archæological Exhibition of the Italian jubilee was inaugurated April 8th at the Baths of Diocletian. Prof. Rudolfo Lanciani, the archæologist and writer, delivered an address, describing what has been done in redeeming the celebrated baths for many years.

The baths were built by the Emperor Diocletian in 305, covering a mile square and accommodating 3,000 bathers. Like the Coliseum, it has been a perfect quarry for mediæval builders. To-day there stand on the site several churches, including the magnificent one of Santa Maria degl' Angeli, into which the sudatorium and tepidarium of the baths were converted by Michelangelo. In recent years the vast halls which remain have been divided into comparatively small rooms, and the corners of the great buildings have become little wine shops, stables, and fifth-rate inns.

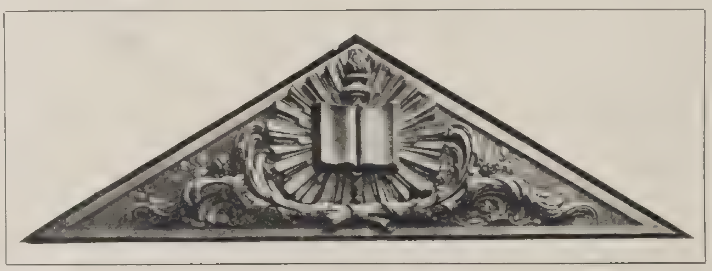
All of the thirty-six provinces of the Roman Empire in Europe, Africa, and Asia have contributed to the exhibition, aided by an appropriation from the government. The exhibition will remain as a permanent institution.

AMALGAMATION OF ART ACADEMY AND SCHOOL OF CLASSICAL STUDIES.

CONSIDERABLE feeling has been aroused over the scheme to unite the Academy of Art and the School of Classical Studies in Rome. The friends of the amalgamation claim that the interests of the artists will be looked after by their own representative, as will be those of the classical students; also that the school or academy will gain immensely in standing and wealth, and will become a social center. Those against the idea argue that the students are there for art, not society, and that such a union would tend to destroy the artistic atmosphere and freedom essential to their work.

There is considerable doubt as to whether the funds which were subscribed for the purely artistic institution can be diverted to other purposes, and that if any subscribers were to object the project could not be carried through. J. Pierpont Morgan is in favor of the amalgamation and intimates that if it is not brought about he will lose interest and may retire from both institutions.

William R. Mead, the architect, is to investigate the practical side of the matter and see if the property on



DETAIL OF PANEL, PAROCHIAL SCHOOL, FREEHOLD, N. J.
Executed by the South Amboy Terra Cotta Company.
Harry A. Young, Architect.

the Janiculum can be adapted for the purpose. It is reported that Mr. Mead regrets exceedingly that, so shortly after the death of Mr. McKim (who may be considered the founder and chief subscriber to the American Art Academy, and who was known to desire that the academy should remain an institution to itself,) his ideals should be so thoroughly set aside.

IN GENERAL.

The tile used in the vestibule arches of Engine House No. 2, illustrated this month, was furnished by the R. Guastavino Company.

The growing popularity of hollow terra cotta tile in building construction is exemplified in the new fireproof passenger station which has just been commenced at Towaco, N. J., by the Delaware, Lackawanna and Western Railroad Company. The partitions as well as the walls will be of hollow tile.

The city of Washington, D. C., will soon have a new structure for the Bureau of Engraving and Printing which is estimated to cost $1,750,000. The building is to be 850 feet long and four stories in height.

The Atlantic Terra Cotta Company furnished Polychrome Terra Cotta for: Madison Square Church, New York, McKim, Mead & White, architects; St. Ambrose Church, Brooklyn, George H. Streeton, architect; Brooklyn Academy of Music, Herts & Tallant, architects; Masonic Temple, Brooklyn, Lord & Hewlett and Pell & Corbett, Associated, architects; St. Francis de Sales Church, Philadelphia, Henry D. Dagit, architect.

MANTEL FOR SUN ROOM.
Executed in faience by the Hartford Faience Company.
Grosvenor Atterbury and Julian Peabody, Associated, Architects.

The "Tapestry" brick for Engine House No. 2, illustrated in this number, was supplied by Fiske & Co., Inc.

Building operations in Cleveland, Ohio, continue to be quite active. The important constructions in addition to the new City Hall building are the new Y. M. C. A. building and the Cleveland Art Museum.

The Architectural League of America announces four University Scholarships for the year 1911–1912, programs for which will be given out May 13th. Further information may be obtained from H. S. McAllister, Sec'y, 1517 H. Street, N. W., Washington, D. C.

Samuel P. Hall of Philadelphia has been admitted to the firm of Marriott & Allen, architects, Columbus, Ohio — the new style of the firm being Marriott, Allen & Hall. Mr. Hall is a graduate of Harvard, and has been connected with the offices of McKim, Mead & White, and Cope & Stewardson.

Herman A. Plusch who contributes an article in this number on the Ceramic Chemical Development of Archi-

HOUSE AT DULUTH, MINN.
Brick furnished by The Ironclay Brick Company.
J. J. Wangenstein, Architect.

RAILWAY STATION, BELLEROSE, L. I., N. Y.
Built of red group "Tapestry" brick in American running bond, with ½ inch mortar joint raked rough, made by Fiske & Co., Inc.
J. C. Fowler, Architect.

tectural Terra Cotta is the chief chemist of the Atlantic Terra Cotta Company.

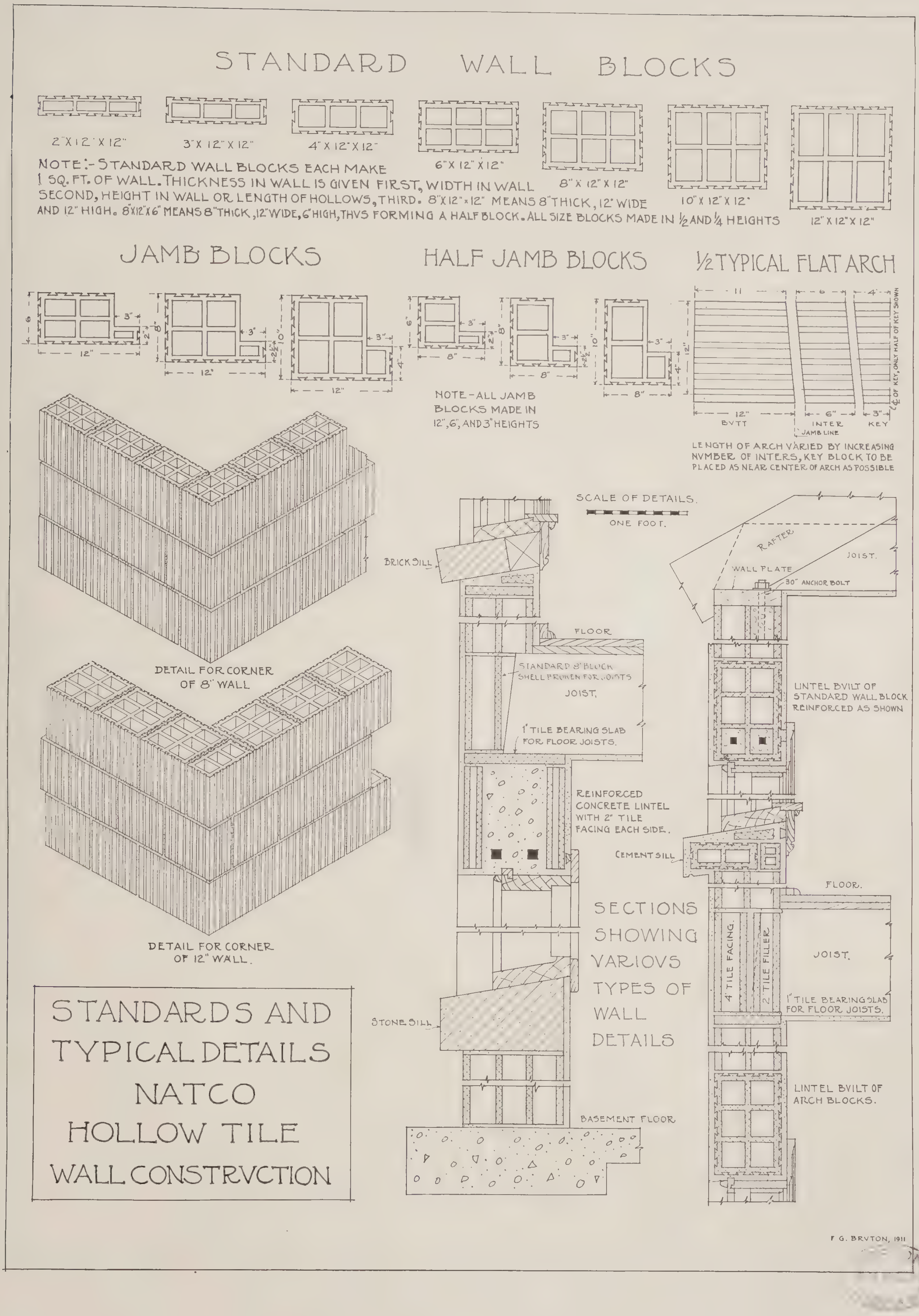
The brick used for the Grover Cleveland Elementary School, Chicago, Ill., illustrated in this issue, was furnished by the Thomas Moulding Company.

W. C. Knighton has been appointed architect for the State of Oregon, with offices in the Capitol Building, Salem, Oregon. Manufacturers' catalogues and samples desired.

Frank Miles Day gave an illustrated lecture before the Architectural League of New York upon the American Academy in Rome, on the evening of April 4th.

The Atlantic Terra Cotta Company will supply architectural terra cotta on the following new buildings: Y.M.C.A., Cambridge, Mass., Newhall & Blevins, architects; Plaza Home Club, New York City, C. W. Buckham, architect; Service Building, Packard Motor Car Company, Philadelphia, Albert Kahn, architect; Y. W. C. A., Youngstown, Ohio, Angus S. Wade, architect; Metropolitan Theatre, Seattle, Howells & Stokes, architects; Tulsa Hotel, Tulsa, Okla., Frank W. Hunt, architect; Baptist Memorial Hospital, Memphis, Tenn., John Gaisford, architect; Ferguson Building, Los Angeles, Cal., George Wyman, architect.

New York City is to have a new Aquarium, which will be the largest and best equipped institution of the kind in the world. Castle Garden, the building which the Aquarium now occupies and which is to be enlarged, is one of the most picturesque structures in the city. The general government erected it in 1807. The structure was first known as Castle Clinton, and was a fortress, which accounts for its walls of 14 feet in thickness, supposed at the time to be bomb-proof.



STANDARD WALL BLOCKS
2"X12"X12"
3"X12"X12"
4"X12"X12"
6"X12"X12"
8"X12"X12"
10"X12"X12"
12"X12"X12"
NOTE:- STANDARD WALL BLOCKS EACH MAKE 1 SQ. FT. OF WALL. THICKNESS IN WALL IS GIVEN FIRST, WIDTH IN WALL SECOND, HEIGHT IN WALL OR LENGTH OF HOLLOWS, THIRD. 8"X12"x12" MEANS 8" THICK, 12" WIDE AND 12" HIGH. 8"X12"X6" MEANS 8" THICK, 12" WIDE, 6" HIGH, THUS FORMING A HALF BLOCK. ALL SIZE BLOCKS MADE IN ½ AND ¼ HEIGHTS
JAMB BLOCKS
HALF JAMB BLOCKS
½ TYPICAL FLAT ARCH
NOTE - ALL JAMB BLOCKS MADE IN 12", 6", AND 3" HEIGHTS
BUTT
INTER
KEY
JAMB LINE
℄ OF KEY, ONLY HALF OF KEY SHOWN
LENGTH OF ARCH VARIED BY INCREASING NUMBER OF INTERS, KEY BLOCK TO BE PLACED AS NEAR CENTER OF ARCH AS POSSIBLE
DETAIL FOR CORNER OF 8" WALL.
DETAIL FOR CORNER OF 12" WALL.
SCALE OF DETAILS.
ONE FOOT.
BRICK SILL
FLOOR
STANDARD 8" BLOCK SHELL BROKEN FOR JOISTS
JOIST.
1" TILE BEARING SLAB FOR FLOOR JOISTS.
REINFORCED CONCRETE LINTEL WITH 2" TILE FACING EACH SIDE.
SECTIONS SHOWING VARIOUS TYPES OF WALL DETAILS
STONE SILL
BASEMENT FLOOR
RAFTER
JOIST.
WALL PLATE
30" ANCHOR BOLT
LINTEL BUILT OF STANDARD WALL BLOCK REINFORCED AS SHOWN
CEMENT SILL
FLOOR.
4" TILE FACING
2" TILE FILLER
JOIST.
1" TILE BEARING SLAB FOR FLOOR JOISTS.
LINTEL BUILT OF ARCH BLOCKS.
STANDARDS AND TYPICAL DETAILS NATCO HOLLOW TILE WALL CONSTRUCTION
F. G. BRUTON, 1911

COMPETITION FOR A SMALL HOUSE TO BE BUILT OF NATCO HOLLOW TILE.

Cost of House not to Exceed $6,000.

FIRST PRIZE, $300.
SECOND PRIZE, $200.
THIRD PRIZE, $150.
FOURTH PRIZE, $100.
MENTIONS.

PROGRAM.

THE problem is a small detached house to accommodate a family of four with one maid. The outer walls and foundations of the house are to be built of Natco Hollow Tile.

The location may be assumed in any town, small city, or suburb of a large city.

The cost of the house — exclusive of the land — shall not exceed $6,000. The method of heating, the plumbing, other fixtures, and finish, to be governed by the limit of cost.

Many houses of this type of construction have recently been built in different sections of the country, and from the data which has been gathered concerning the cost of a large number of these houses, an average price per cubic foot has been obtained. This cost is given as the basis upon which the size — figured in cubic feet — of each house submitted in this Competition must be approximated. The price is $0.20 per cubic foot.

Measurements of the house proper must be taken from the outside face of exterior walls and from the level of the basement floor to the average height of all roofs. Porches, verandas and other additions are to be figured separately at one-fourth (25 per cent) of their total cubage. The cost of porches, etc., is to be included in the total cost of the house ($6,000).

On this basis of figuring — the number of cubic feet multiplied by the cost per cubic foot — the jury will not consider any designs which exceed the limit of cost.

There are no restrictions as to the shape and style of the house or the size and location of the lot.

The particular object of this Competition is to encourage the study of the possibilities in the use of Natco Hollow Tile in the exterior walls of houses. Here is a durable material which will insure a house being warmer in winter, and cooler in summer; easily meets in all respects the demands of the designer, and gives to the house that permanent value which is lacking in the more perishable materials. A house can be built of this material at very little more cost than one built of wood, or of plaster on wire lath and stud. The walls are knit together as solidly as if built of stone. The cost for up-keep is nothing. Any mason of average ability can easily do the work.

CONSTRUCTION.

The following suggestions are offered as being practicable and admissible.

First. Outside walls may be of Natco Hollow Tile 8 inches thick (8 inches by 12 inches by 12 inches). Foundation walls, below grade, should be not less than 12 inches thick. The blocks being heavily scored on two sides, stucco may be used for an outside finish and plaster applied direct to the block for interior finish.

Second. The walls may be built double using in the outside wall a 4-inch hollow tile, and on the inside a 6-inch tile. The treatment of the face of such a wall, and the manner of bonding the outer and inner walls are left to the designer.

The floors and roof need not be of fireproof construction.

DRAWING REQUIRED (there is to be but one).

On one sheet a pen and ink perspective, without wash or color, drawn at a scale of 4 feet to the inch. Plans of the first and second floors at a scale of 8 feet to the inch. A section showing construction of exterior wall, with cornice. A sketch showing detail of front entrance. In connection with the plan of the first floor show as much of the arrangement of the lot in the immediate vicinity of the house as space will permit. The plans are to be blocked in solid. A graphic scale must accompany the plans. The character of the exterior finish must be clearly indicated on the perspective and detail.

The size of the sheet is to be exactly 34 inches by 22 inches. Strong border lines are to be drawn on the sheet 1 inch from edges, giving a space inside the border lines 32 inches by 20 inches. The sheet is to be of white paper and is not to be mounted.

The drawing is to be signed by a *nom de plume* or device, and accompanying same is to be a sealed envelope with the *nom de plume* on the exterior and containing the true name and address of the contestant.

The drawing is to be delivered flat, or rolled (packaged so as to prevent creasing or crushing), at the office of THE BRICKBUILDER, 85 Water Street, Boston, Mass., on or before June 26, 1911.

Drawings submitted in this Competition are at owner's risk from time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The designs will be judged by three or five members of the architectural profession representing different sections of the country.

First consideration will be given to the fitness of the design, in an æsthetic sense, to the materials employed: Second — the adaptability of the design, as shown by the details, to the practical constructive requirements of the material.

Drawings which do not meet the requirements of the program will not be considered.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. The full name and address of the designer will be given in connection with each design published. Those who wish their drawings returned, except the prize drawings, may have them by enclosing in the sealed envelopes, containing their names, ten cents in stamps.

For the design placed first there will be given a prize of $300.
For the design placed second a prize of $200.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

This Competition is open to everyone.

The prize and mention drawings will be published in THE BRICKBUILDER.

On the preceding page will be found examples of construction which may be helpful to competitors.

THE BRICKBUILDER

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Advertisements will be printed on cover pages only.

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FROM WORK BY

FRANK A. BOURNE; EDWARD T. P. GRAHAM; WILLIAM M. KENYON; MacCLURE & SPAHR; MAGINNIS & WALSH; PEABODY & STEARNS; REED & STEM.

LETTERPRESS

CHURCH OF SAN DIEGO,
AGUAS CALIENTES, MEXICO.

The field of the dome is composed of alternating rows of buff and white tile, the ribs and top of lantern of blue and white.

Christ's Hospital School.

BY HENRY A. FROST.

PLANS BY WALTER G. THOMAS.

CHRIST'S HOSPITAL SCHOOL, or as it is more familiarly known to Englishmen, the "Bluecoat School," was founded by Edward VI. in 1553, in London, on the site of the Grey Friars, as a mathematical school for boys and girls. Under royal patronage the school grew so rapidly that eventually it was divided, the boys' division remaining in London, while the girls were transferred to Hertfordshire. But in spite of this division the London school was for many years handicapped in its cramped quarters. Not until 1894 however did the authorities take a decisive step to improve the situation. Then a committee was appointed to study conditions and to advise as to the establishment of a new school. This committee reported that while for ease of control, convenience and economy of administration, the medieval quadrangle plan admits of no improvement, still for conditions of healthy life it has some defects. It is unsanitary because an inclosed quadrangle with its four corners excludes some sunlight and causes a stagnation of air. An abundance of sun and a free movement of air being considered a prime requisite of health for the boys the committee advised the adoption of a plan which would separate the buildings.

They further recognized that such a principle pushed to extremes would result in an unworkable plan and so advised a combination of the two principles, the dormitories to be well separated and given a southern exposure, and the working portion to be disposed around a cloistered quadrangle in order to permit a greater facility in management.

GREAT HALL.

The requirements of the competition as then drawn up called for fourteen houses each to accommodate fifty boys in dormitories of not more than twenty-five nor less than ten beds. Each house was to provide ample day rooms, baths, lavatories, sitting rooms and bedrooms for a house master and an assistant master, a sitting room and a bedroom for a matron and studies and cubicles for two monitors. The suggestion was also made that the houses would best be arranged in blocks of two or three for greater ease of discipline.

A head-master's house and at least six other masters' houses were required.

There was to be a dining hall centrally located having a seating capacity of eight hundred and twenty with adequate kitchens and accommodations for the kitchen staff, and closely connected with it, a master's common room.

Sufficient housing was required also for a smaller preparatory grade, the treatment of which could be more or less independent of the rest of the group. Finally the residential requirements of the competition included very complete hospital accommodations with wards for at least one hundred boys, dispensary, operating room, a separate kitchen, and isolated fever wards.

The educational group, according to the program, required a "Speech Hall" of sufficient size to seat the whole school with space for an organ and an orchestra at one end and thirty class rooms varying in size grouped as far as possible — except the science class rooms — around or contiguous to it. There was also required a science school with chemical and physical laboratories, a library and museum which might be contained in one building, sufficient drawing rooms, and a chapel.

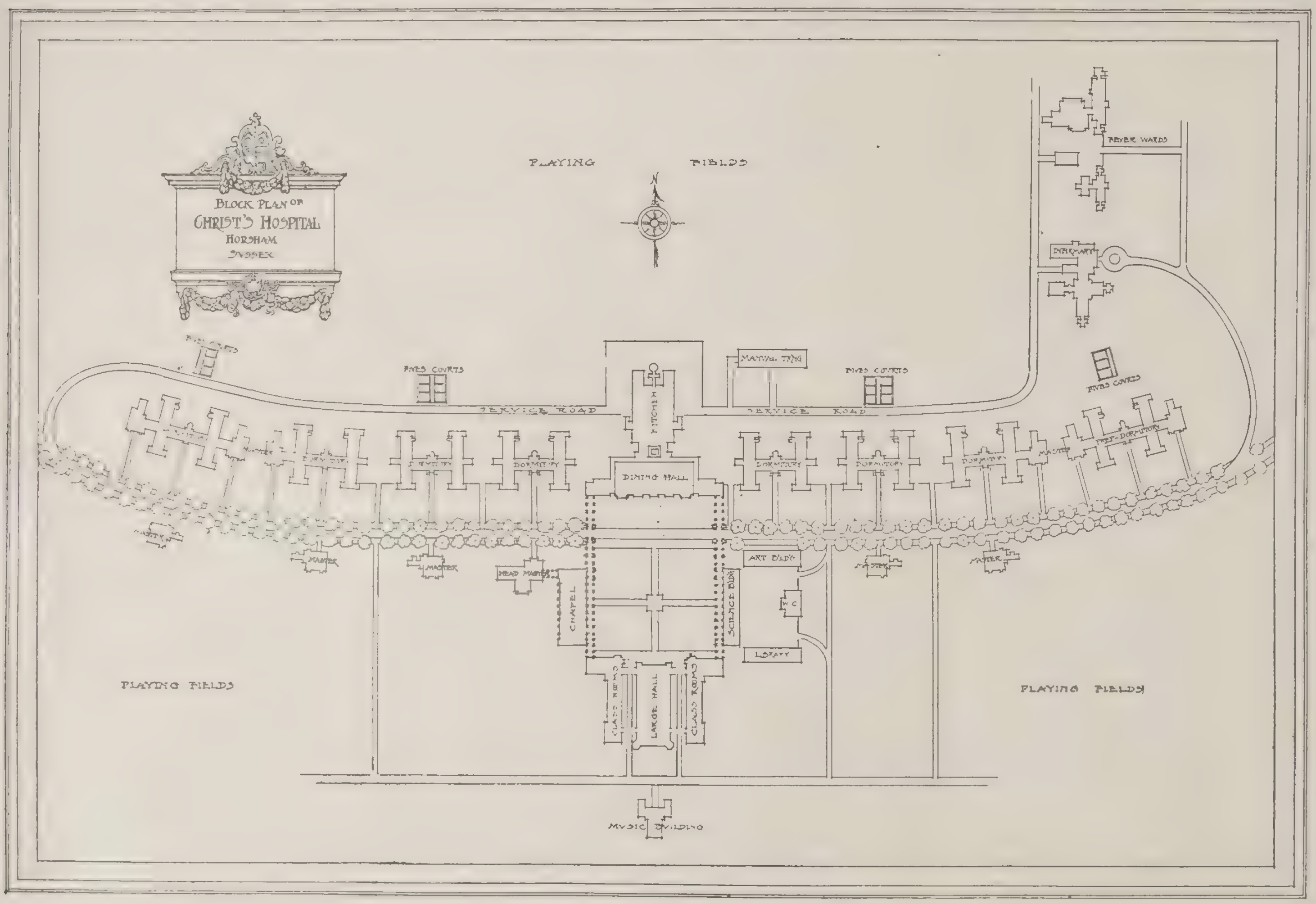
After due deliberation the competition was awarded to Messrs. Webb and Bell whose plans, it was decided fulfilled the requirements more skilfully than did those of any other architects competing. It was not however until 1897 that the corner stone of the dining hall was laid by the Prince of Wales (afterwards Edward VII) representing Queen Victoria. The day chosen for the ceremony was October 23d, the anniversary of the birth of the school's founder, Edward VI. For five years the work proceeded rapidly so that in 1902 the school stood ready to receive some seven hundred boys ranging in age from six to seventeen years.

The new school is admirably situated near Horsham, in Sussex, on a broad natural plateau somewhat above the level of the surrounding country where it receives the full benefit of sun and air. Two stone posts carved with shields and surmounted by lamps brought here from the old London school mark the entrance to the grounds. A driveway curves up a slight incline towards the school. To the left is an octagonal keeper's lodge of brick and plaster, perhaps the least successful building of the group. To the right of the drive, and well separated from the other buildings, are the fever sanitorium, and the infirmary which is in reality a fully equipped hospital with three large wards having accommodations for one

hundred boys. These rooms are lighted by windows on the two long sides. At the end of each room but separated from it by a short passage so that they form an annex are lavatories and baths. This treatment which occurs again in the dormitories is an interesting feature of the plan. There are numerous smaller rooms for more advanced cases, but as a rule if a boy is in a serious condition, though still able to be moved, he is tended outside the school. The purpose of the infirmary is rather to care for those ills and bruises so common in a boys' school. The surgical room therefore while equipped for any emergency seldom witnesses anything more serious than the dressing of a cut, the bandaging of a bumped head, or the treatment of a strained muscle.

dormitories and on through the school grounds until it reaches the public highway again. A glance at the plan will show that half of the living quarters of the school lies on each side of the quadrangle with the dining hall as the dividing point. The two dormitories at the end of the line, and furthest removed from the quad, are given over to the preparatory department.

The dormitories are built on an "H" plan. The governing portion containing the rooms of the resident master, his assistants, the matron and her assistants, lies in the connecting link. The central entrance used only by the house officers and visitors, gives directly to their studies and living apartments, and to stairs for their use, permitting access both to the upper floors, and to the



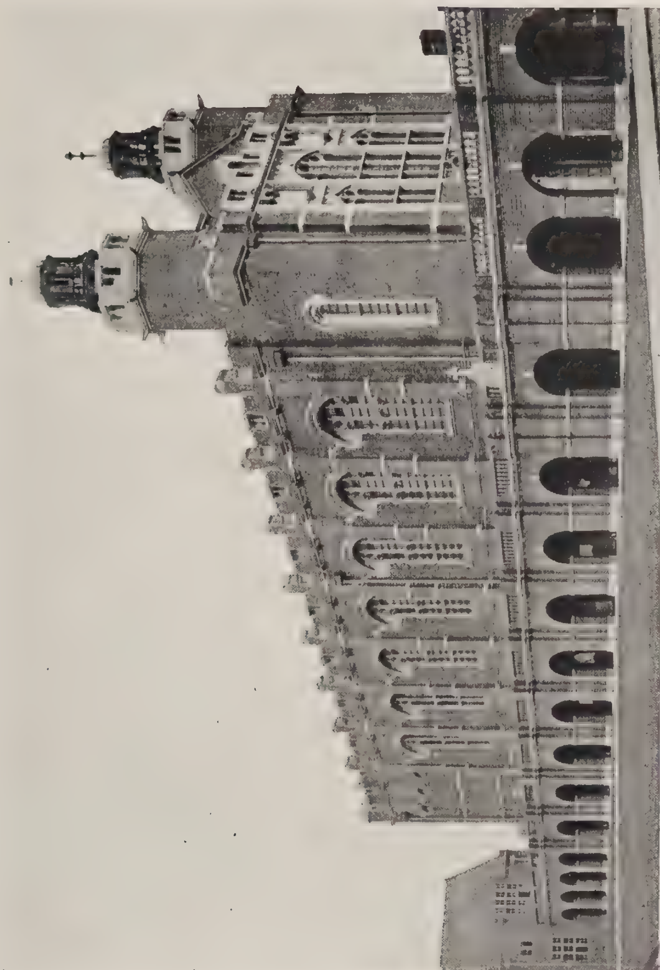
BLOCK PLAN OF CHRIST'S HOSPITAL SCHOOL.

On the ground floor are the doctor's office, the dispensary where prescriptions are filled, and waiting rooms for the boys. Above is a large living room for convalescents. Behind the infirmary is the fever sanitorium consisting of an administration building, a scarlet fever building with room for thirty beds, and a diphtheria building with room for fifteen beds. As in the case of the infirmary each of these is in itself a fully equipped hospital with its wards, small bedrooms, nurses' quarters, kitchens and lavatories. Each one is a complete unit requiring no communication with the others, and kept in readiness for instant isolation from the rest of the school.

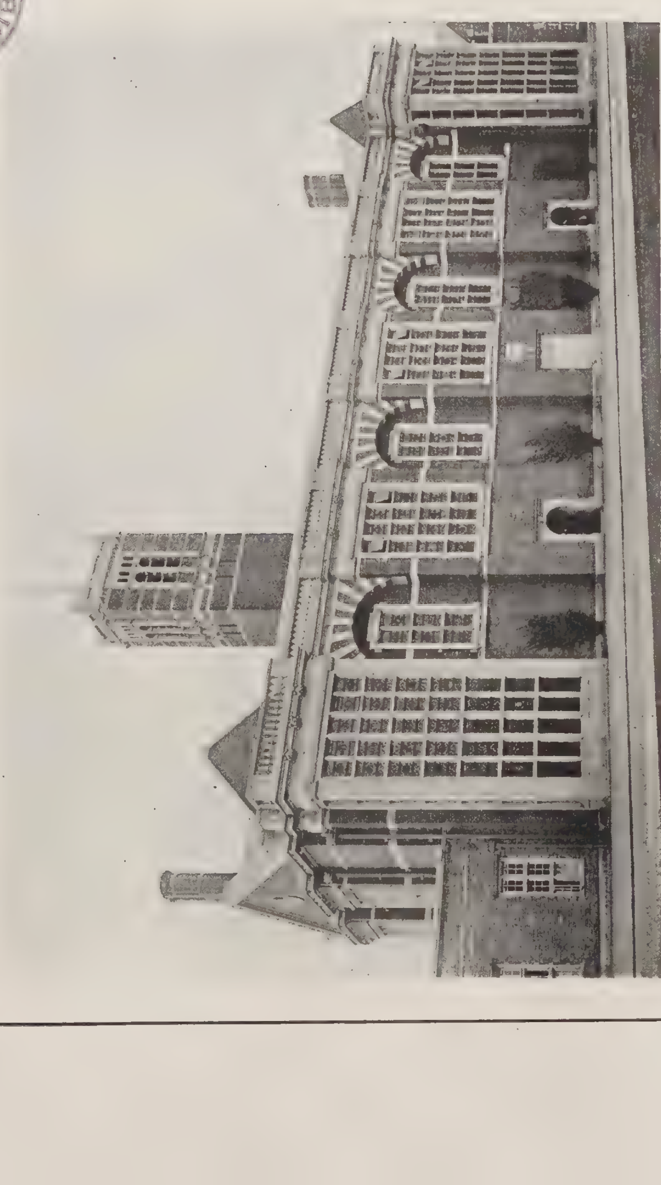
After passing the hospital group the road sweeps in a great curve past a line of dormitories, crosses the quadrangle near one end and continues past a second line of

service subway which connects all the buildings of the school. To each side of this central entrance are corridors leading to the boys' entrances which are located at the ends of the building. These give direct communication on the ground floor to large sunny day rooms under the supervision of two monitors whose studies open from them. They are provided with study tables and benches while along the walls are cupboards for books and papers. Across the corridor are changing rooms where every boy has his athletic clothes and bags for towels and soap. Adjoining are the shower baths. Thus the necessity for a central gymnasium is done away with. Indeed in a country where exercise out of doors is possible practically all the year and in a school where every boy is required to interest himself in some out-

LARGE HALL.



CHAPEL.



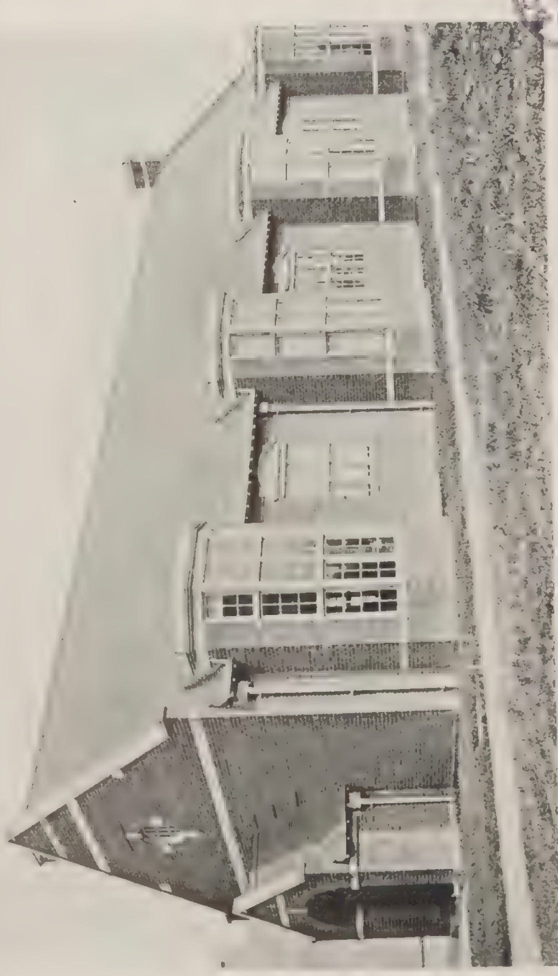
DINING HALL.

SCIENCE BUILDING.

VIEWS OF CHRIST'S HOSPITAL SCHOOL,
HORSHAM, SUSSEX, ENGLAND.

VIEW OF GREAT QUADRANGLE.

MASTER'S HOUSE.



LIBRARY AND MUSEUM.

GATE LODGE.

VIEWS OF CHRIST'S HOSPITAL SCHOOL,
HORSHAM, SUSSEX, ENGLAND.

INTERIOR OF CHAPEL.

INTERIOR OF CHAPEL.

ENTRANCE TO LARGE HALL.

ENTRANCE TO DORMITORY.

VIEWS OF CHRIST'S HOSPITAL SCHOOL,
HORSHAM, SUSSEX, ENGLAND.

door sport, not once in a while, but regularly, this arrangement is much more satisfactory. On the ground floor are also boot rooms. The dormitory rooms in the second and third stories accommodate twenty-five boys each. The beds are ranged along opposite sides of the room as in a ward. At each end, separated by open air passages, are lavatories as above mentioned. Every boy is required each week to take two hot baths and a complete change of clothing. The school furnishes the clothes and while each boy keeps his own frock, trousers, and shoes, his underclothes are given out twice a week. In addition to direct ventilation from many windows each dormitory has a system of flues in the walls connected by trunks in the roof with a large ventilator on the ridge which contains a steam coil.

The drive enters the great quadrangle through the cloisters which run down the two long sides and which would be rather gloomy corridors were it not for the fact that they are partially open to the sun. To the right, at the foot of the quad, the dining hall, which seats the whole school, is so placed as to be most convenient both to the dormitories and to the class rooms. At the east end of the Hall is a dais with long tables for the masters and directly behind it the masters' common room. In back of the hall are the kitchens equipped with all the most modern culinary appliances and behind them again are the living quarters for the kitchen staff. The tower which rises above this group can be seen for miles around.

At the head of the quadrangle dominating the entire group is the great "Speech Hall" flanked by lower buildings containing the class rooms. The main entrance, a very successful piece of detail, opens into a spacious vestibule which gives access to the hall and by stairways to the balcony. The hall is approximately 130 by 50 feet and about 50 feet high with a seating capacity sufficient for the whole school. The pipes of the great organ are made to play an important part in the scheme of decoration and the timber roof treatment is not unlike that of Cardinal Wolsey's chapel in Hampton Court palace. Here, in striking contrast with the dining hall, there are ample exits at the rear and along the sides as well as along the front of the building. The north wall has set into it a bit of the original design executed by Sir Christopher Wren for the London school consisting of a pilaster treatment with pediment and a semicircular niche for a statue. The illustration will show that the composition is readily distinguishable from the rest of the wall because of the different character of the brickwork.

The chapel is placed with its side to the quadrangle and its front facing the avenue from which it is entered by a vestibule though access is also given by smaller doors opening into the cloisters. The scheme of plan is similar to the usual collegiate solution of the problem as seen at Oxford and Cambridge, consisting of a broad central aisle running the length of the chapel with seats in parallel tiers on each side. The interior treatment is very interesting. All woodwork is of oak left in its natural state. The walls are paneled to the height of the balcony floor, and above this the brick walls show, broken only by a stone line marking the base of the windows, by stone architraves, and stone corbels carrying the open timber roof which is also left in its natural color. The reredos screen and the pulpit are of very delicately carved Caen stone.

The science building, which balances the chapel, needs no comment except perhaps to call attention to the rather unusual wall treatment in the second story of the three projecting bays. The library and museum are in a small one story building of no particular interest. The manual training building, recently added, is in harmony with the rest of the group. In the center of the quadrangle is a very fine memorial monument arranged with seats on the four sides, and buttresses containing drinking fountains in small niches, at the angles. A life size statue of Edward VI surmounts the monument flanked on the corners at a lower level by statuettes of Coleridge, Lamb, Middleton and Maine, former students of the school who afterwards became famous. The figures are all represented in the school dress of frock and knickerbockers. In the quadrangle, which measures approximately 250 by 375 feet, one is impressed by the evidently intentional lack of trees and planting of any kind though the avenue of approach is well lined with young trees which offer a pleasant relief from the monotony of brick walls. Here however no attempt has been made to secure such relief, possibly in order to insure the full play of sunlight and the free movement of air which the authorities decided was of such importance to the health of the boys.

It might be interesting in closing to give some idea of the life led by the boys in this rather ideal school — which the neighboring townspeople speak of as the "Red City on the Hill." The school is conducted on a lenient military basis. The day is begun by chapel exercises at 7 o'clock to which the boys march by houses and from there to breakfast. The time from 8.15 to 12.15 is given over to class work. A recreation hour is then allowed before dinner after which work is again resumed at 2.15, and lasts until 4.15, when there is recreation again until 6, during which time practically every boy is engaged in some outdoor sport. The school clings to many old customs, as for instance, the uniform which has not changed since its foundation and consists of a heavy blue frock, reaching almost to the knees, blue knickerbockers, white stockings and black shoes with large buckles. This costume which seems to us somewhat cumbersome does not bother the boys at all. When playing their games they simply pull up the skirts and tuck them into their belts. Another old custom, more practical if less picturesque than the uniform, is the rule that every boy must black his own shoes and keep the pair he is not wearing for the day in condition to pass inspection. Each boy has a pigeon hole for his brushes and polish, and is held responsible for them. Still another custom which tends to produce in the boys a spirit of independence and an ability to help themselves is that of detailing certain boys each day to set the tables in the dining hall. No student is excused from this duty. The school it will be seen not only makes itself responsible for the mental and physical development of its seven hundred boys but concerns itself also with their morals and with their religious training, — in a word strives to make men of them. Certainly one would have to travel far to find a more manly looking set of boys.

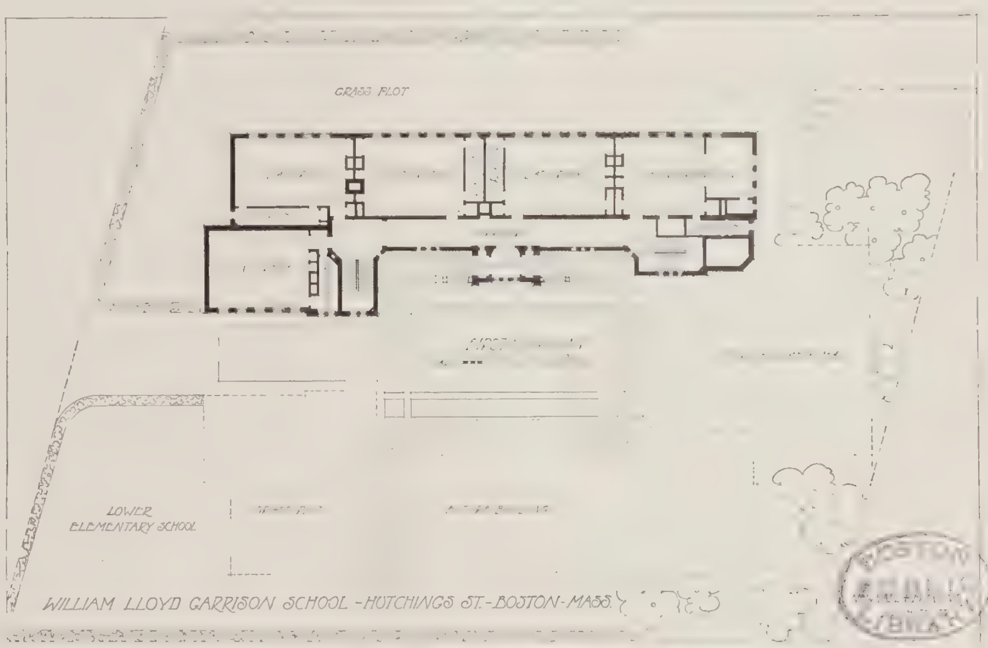
Some Problems in School Planning.

FIRST PAPER — THE ELEMENTARY SCHOOL.

BY R. CLIPSTON STURGIS.

WITH the concentration of life in great cities, and the consequent loss of that training which comes naturally in an agricultural community, there has arisen a demand for some training of hand and eye to supplement the purely mental exercise of the school. On the farm the ordinary everyday life gave exercise, and training in the use of tools; and in the villages and small towns the accessible country and the tool shed and household service gave varied occupation. In the large cities these important elements in education are not naturally present; even home and its housekeeping has disappeared more or less, and it was to provide such that the first movement toward broadening the school curriculum took place. The tool shed and the kitchen stove were introduced into the elementary school.

About the same time a movement was started to care for children who were below the school age. This again met a civic condition and was intended to solve a problem which in the country did not exist. There the little children could safely be about the house and out of doors without interfering with the ordinary day's work of the mother or occupying her time unduly, but in the city a constantly growing percentage of mothers was forced to work away from home and there was no one to care for the children. It was more to meet this civic condition than to carry out Froebel's theories in education that the kindergarten room is so well filled in the city school.



The plan for an upper elementary school arranged for future extension, assembly hall making connecting link on first and second floor, by Newhall & Blevins.

The equipment for all this work — cooking, manual training and kindergarten — meant added rooms and teachers; for at one end of the grades additional pupils were admitted, and at the other, additional instruction required special rooms. Both these added to the cost of elementary buildings and elementary instruction.

Along the same lines and to meet the same kind of demand — that is, to give what one might have expected the home to provide — were the sewing class, the school library, the drawing room; and each of these made demand for space and for teachers.

Up to this point each branch added to the elementary course was added with a view of giving the city child what the average country child got in home life.

The next step was to meet another civic condition, especially marked in manufacturing centers. At fourteen the child, whether or not fit mentally and physically, might be withdrawn from school and set to work. In many cases work meant tending a machine or some similar narrow occupation where education stopped and atrophied. Compulsory education presupposed conditions in the school and home which, especially among the foreign population, did not exist, and children were being dismissed from school, or rather withdrawn, before they had obtained the education which eight years of school life was supposed to give. Parents could not be forced to give them more and school authorities therefore suggested courses which might be expected to have a direct bearing on the wage-earning capacity of the child. This again meant added courses and equipment in the school curriculum, or, failing to reach the child before the working life began, opportunity for evening instruction; the one intended as an inducement to keep the child longer in school, the other intended to counteract the narrowing influence of factory work by supplementing and filling out the meager elementary education. Again this required added teachers and accommodation.

In the former, the useful courses serving as a bait are the industrial courses now being introduced here and there in the elementary schools (for the child of fourteen has not always finished his course here), and in the latter, the continuation schools of the simplest character.

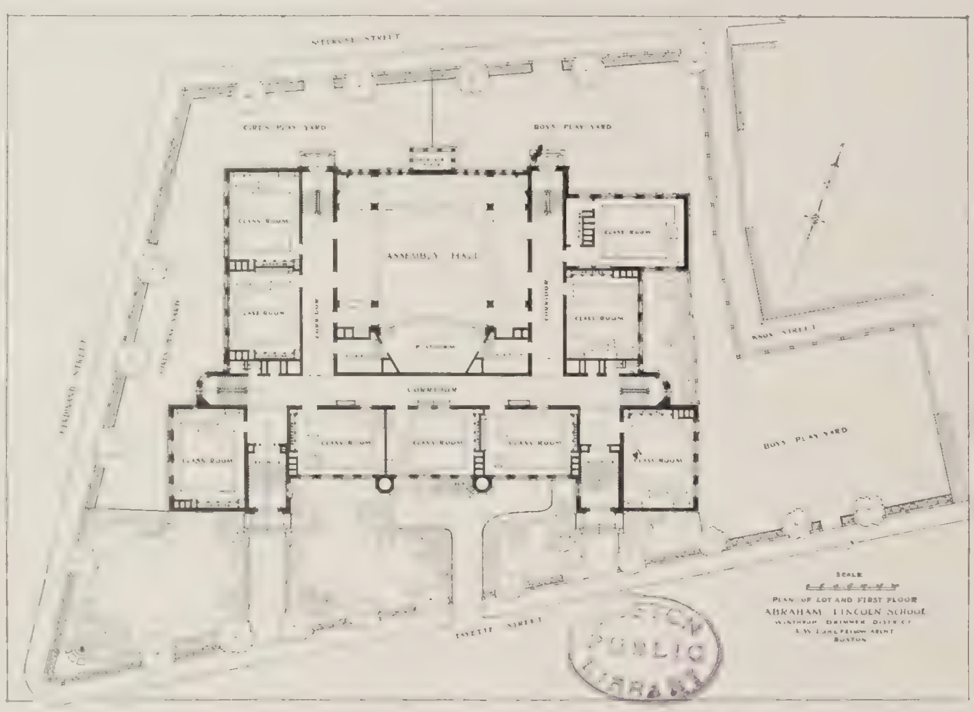
Thus far the changes in elementary school courses had been made largely if not wholly to make good something which had been lost.

(a) To replace what simpler conditions of life provided, there are added to the city elementary school, kindergarten, cooking, manual training, sewing and drawing.

(b) To meet the need of those who had not received at

fourteen years of age the education which was contemplated when that limit was fixed, there are added various courses which by their practical character may tempt the child to longer attendance until he has received the education which the age limit was meant to represent. These are courses which have a direct bearing on an occupation or trade — housekeeping or dressmaking, clerical work or mechanical. But it is not only to replace something that has been lost that educators now are striving, but also to make that advance in methods of education which is necessary to enable our children to cope with modern conditions and requirements. The early trader in foreign lands could exchange glass beads for gold and ivory, a bottle of fire-water for beaver and white fox; the modern trader, in sharp competition with his brother trader, must fight with well-trained brains for his market. Life is complex and education must conform to the complexity and supply the child with the weapons of modern warfare.

All this means rapid increase in the cost of building and maintaining our schools, and one is confronted with the question — not, is it worth while to do, but — is it worth what we are paying? or, still more to the point are we providing this very necessary education in an economical way?



A large upper elementary school of forty rooms by A. W. Longfellow. Assembly hall on first floor and all rooms arranged to have sunlight at times. Note that the only room with a northerly exposure has windows on south angle.

Before attempting to answer these problems one must consider the similar demands of modern education as they affect the secondary schools. The earlier types of secondary education were simply High and Latin Schools, the former fitted for the ordinary occupations of business and trade, the latter led to college and the professions. It is a long time now since a classical education has been a requisite for college, and but a small proportion of students go to college because they intend to teach or preach or practice law. The secondary schools instead of running smoothly in two well-defined channels, branch in innumerable directions, and the school is expected to guide the pupil along any of these courses.

The secondary school seeks to cover many fields, and indeed must cover them if it is to meet fully the demands of modern life. It must train for college and for technical schools; it must round out and complete as far as possible the education of those who go no farther, and prepare its graduates for a business career or for life as a mechanic or as a tradesman. More and more one finds that in every trade and occupation intelligence is of greater value than mechanical skill, and so the secondary schools must be equipped to train the clerk to more than using a typewriter and to give the mechanic more than just the ability to run a power lathe.

In the elementary school the problem is comparatively simple — to give some manual training and such industrial work as shall hold the children longer; in the secondary schools the problem is very complex. In large cities it may be met by a variety of secondary schools each having its special course — its special end in view — but in smaller communities where the demands are nearly as varied this cannot be done and some way must be found of offering the different courses in one building without too great expenditure for the apparatus.

The modern secondary school must lead on the one hand to further education, to academic colleges and to polytechnic schools, to commercial colleges and trade schools; and on the other hand it must train the child for good citizenship and effective work in almost any walk of life. To do this practically — that is so as to obtain the results — and economically — that is spending freely for what is necessary but nothing except that — is the modern problem in school planning and equipment. The first aspect of the problem is one for the educator to answer, the second is for the architect, and neither aspect has had sufficient study to make possible the intelligent planning of modern schools. Germany and England have advanced further than we, partly under force of necessity (with them it was a matter of vital importance to keep their foreign trade, and they believed rightly that education alone could accomplish this, and partly through organization. Here, we are not fully aware of the necessity, and are without organization. Completely content in the belief that we are among the great ones of the earth and self-sufficient, we seek indifferently the expansion of our trade. Communities, with like aims and objects, study independently and profit neither by the failures nor by the successes of each other.

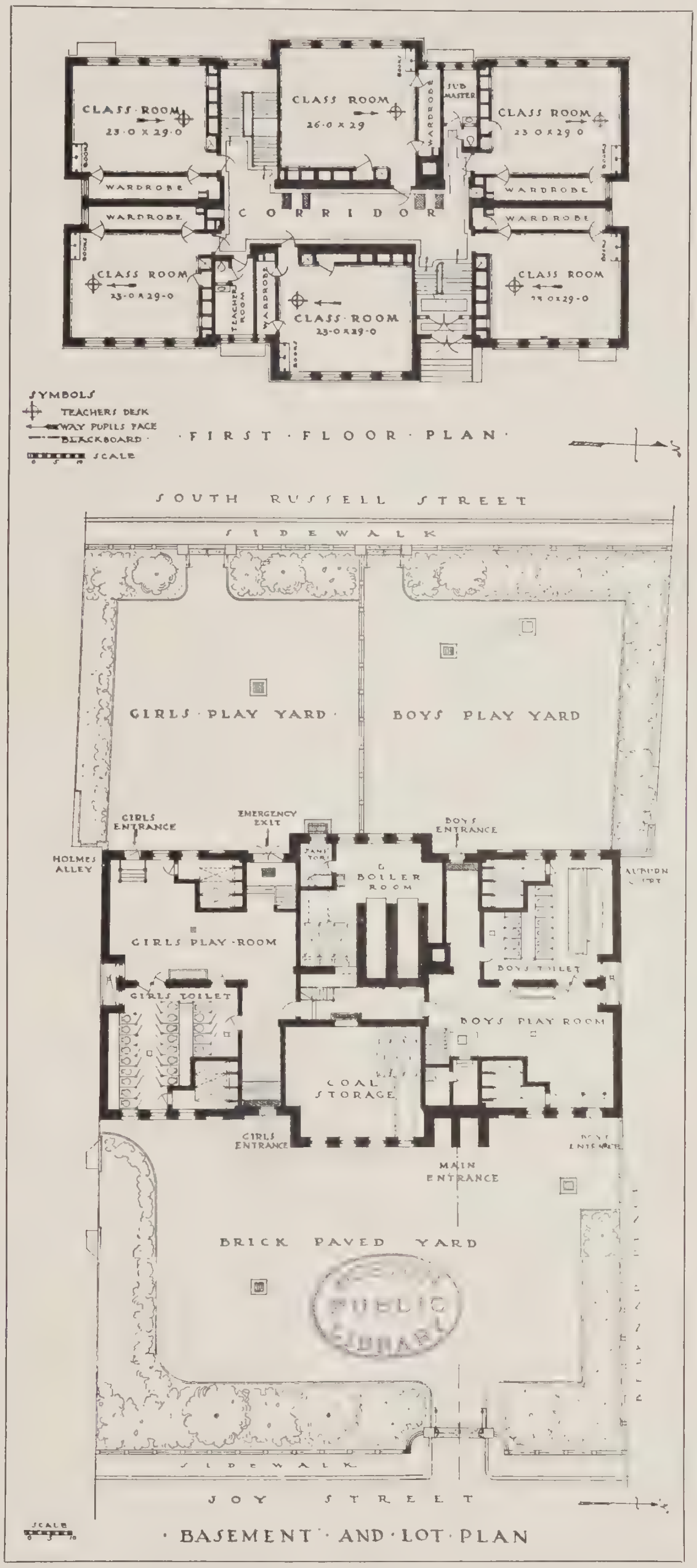
One is convinced that the country is now pretty well

aroused to the necessity of increasing the efficiency of the schools, and believes in organization for the study of the problem. The practical way to accomplish this would seem to be under the Commissioner of Education at Washington, before whom could be laid for tabulation the results of experiments throughout the country. Until such centralization is effected much effort will be wasted.

The following suggestions are based on observation in a narrow field and can be considered as suggestive only. They are the less useful because no one of the experiments in education has been sufficiently followed up to serve as a conclusive test of the efficiency of the instruction given. Until one knows that the cooking class has taught the pupils to cook one lacks assurance that the course in cooking is right, just as one suspects something amiss if eight years' schooling fails to teach the pupil how to write English, or even to spell.

It is proposed to take first the elementary schools, and then the secondary, and review in each (a) what is demanded, (b) what furnished, (c) what is accomplished, (d) what it costs, and then consider whether the same results could not be accomplished more effectively with simpler equipment.

In the elementary school the following are demanded: Kindergarten to take those who are below the school age (a matter not always easy to determine in towns filled with emigrants — Dr. Gulick suggests judging by teeth rather than birth certificates); cooking classes to train girls in the rudiments of the work in the home kitchen; manual training to give the boys (and girls too sometimes) a knowledge of the use of tools or control of their hands; sewing for the girls to help them to be useful at home; drawing for girls and boys to train eye and hand and teach some love of beauty; science, the simpler elementary things, to give them a better understanding of natural processes; the assembly hall, for common exercises, to teach them the value of concerted work, eradicate self-consciousness and encourage self-confidence; the gymnasium to train and harden the body and teach self-control and coöperation in sport; shops for wood and metal working or other general trades more advanced or more specialized than the manual training room to fit the boy to be a better wage-earner, or shops for dressmaking, millinery or domestic science to do the same for the girls.



A lower elementary school by James T. Kelley and Harold J. Graves, Architects. An exceptionally compact plan on a city lot running through from street to street, but without opportunity for light at the sides. All the rooms have east or west exposure.

In addition to all this indoors there is a demand for playground facilities outside where recreation in school time and the hours after school may be spent in play and sport for physical and mental development. Finally, many believe that even the city child should have nature-studies to bring him into touch with at least his native flora and fauna.

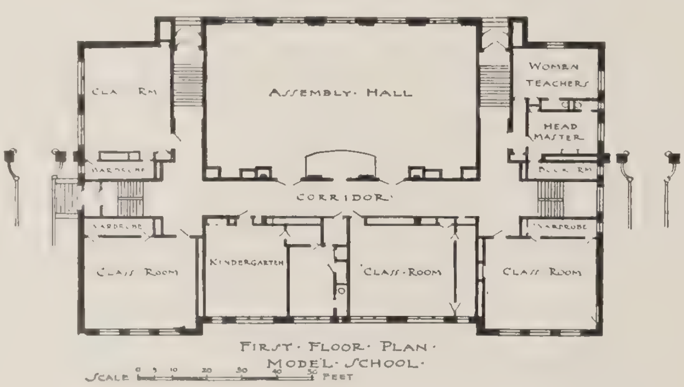
These are the demands made for the first eight years of the child's education; when added to the usual academic curriculum it makes a formidable list. With each of these branches one may consider what is provided, what is accomplished and what it costs.

The kindergarten is provided pretty generally in the elementary schools and serves the admirable purpose of a crèche where the children are cared for and kept off the streets. Educationally one hopes that the children learn something useful, perhaps cleanliness and obedience. If this is all the kindergarten does there is no very obvious reason why the city should not extend the scope and include the babies as well. It is worth study to determine how much one is justified in spending for this purpose. Rooms for fifty or sixty

occupy the space of a class room seating fifty and represent roughly speaking $7,500 of building.

The cooking room is generally provided and equipped for classes of twenty. Three or four classes a day for five days is about the limit of what one such room will serve. The equipment is simple and practical and it remains only to prove that the children are taught to do what will be of real use in the homes of their parents or in their own homes later. The work requires room and costs about what the kindergarten space costs ($7,500). But in this case no additional child is admitted; the room is used for additional instruction to the girls who have desks elsewhere. Both cooking and sewing are household occupations, and with them go cleanliness, neatness and order. One is inclined to doubt whether the teaching leads directly to its practical end, but if it does it would seem entirely feasible to put the results in practice in the school itself by having lunch (a growing necessity in many poor districts of our cities) provided by the girls of the second year cooking class and by having all the girls take part in the house cleaning and order of the class rooms.

What applies to the cooking for the girls applies with greater force to the manual training for the boys. This occupies the same space, costs the same and provides for the same number of pupils. For the most part they are occupied in somewhat purposeless work. The boy on the farm learns early to use tools to some purpose and gains thereby what no purposeless work can give. It would seem practicable to have all minor repairs about the school done by the boys who have proved themselves efficient and trustworthy. One is inclined to think that there would be rivalry to be allowed to do this work. Then while the girls kept class rooms clean the boys would polish desks and floors, set broken glass and replace window cords; and both girls and boys would take pride in their class rooms. Once the kitchen and shop became merely the training place for real work, a room in the basement or a shed might serve. The end after all is the training of the child and the only problem is how best to arrive at that end.



A standard type of plan for an upper elementary school with assembly hall on first floor. The building is three stories. This school, planned for a training school, contains all grades from kindergarten to the eighth.

Drawing like writing is but a training of the eye and hand, but unlike writing it is not expected that every pupil will learn to draw as all are expected to learn to write. Useful as drawing is, one is inclined to think that part at least of the time given to it might with advantage be devoted to writing. Practice in lettering is one of the best of all drawing exercises and is a help towards good handwriting. Drawing should be done in the class room and not add to the cost of the building. It is not a question of money expenditure but of time spent and the results of that time.

Such science as may properly find its place in the elementary schools does not require laboratories or lecture rooms, and except as incidental to other lessons is out of place. It does not require expenditure and may therefore be disregarded here.

The assembly hall is an accepted feature of nearly all elementary schools, certainly of all which include the upper grades, and that it is a useful and indeed a necessary part of the equipment cannot be denied. It is however a costly feature, and is often not used sufficiently to justify the cost. The smallest halls would represent two class rooms ($15,000) and the larger ones four to six rooms. Four rooms ($30,000) is a considerable investment, and one should be sure so to arrange for its use as to justify the cost. Twenty minute exercises once a day, occasional singing lessons and a few lectures — some of which are public — are not enough. A gymnasium is less frequently provided in elementary schools than a hall and yet the gymnasium would be in use all day and every day. It would seem entirely feasible to have the hall serve a double purpose. The morning exercises, reading and singing for the whole school, might be standing so that the floor would be available at once for classes, or the floor might be cleared of its benches in five minutes by the organized aid of the pupils. A hall for this double use might well be simpler than the somewhat pretentious rooms which now serve the architect as an opportunity for display of skill.

Ordered exercise and play do not occupy a sufficiently important place in the elementary school. One is inclined to think that the child in its active years of growth would study better if his mental work were frequently varied with physical exercise, and that education would gain by his taking part in organized sport where he will learn discipline and coöperation. This is all conjecture, but it appears worth considering.

The last, or rather the latest, demand is for study that may be called vocational — that leads to some definite end. In a way it is rather a misnomer, or a reflection on other studies, as if they had no practical end in view. Under this head would come typewriting and stenography, work in cloth, cardboard, wood and metal; trades innumerable when you once begin. Nearly all of these require additional space and special teachers, and only when the child is unable to get this education later or when only such opportunity will hold him in school at all does such work seem excusable in an elementary school. One may perhaps pass it by here to be considered later under the secondary schools, remarking merely that if introduced it should be only after such study as shall insure the accomplishment of the end in view. Generally speaking one is inclined to think that the kitchen and the shop, together with what can be done in the class room and the assembly hall, will give the child about all the instruction he can profit by during his first eight years of school. If this is supplemented by physical exercises and games that stimulate his interest while they exercise his body and give him some training in obedience and coöperation he will be fairly well fitted to carry his studies further, or, if this cannot be, to take up his work in life.

The Heating and Ventilation of Halls.

BY CHARLES L. HUBBARD.

THE chief difference between the methods employed for the ventilation of churches and halls depends upon the fact that it is usually necessary to keep the floor free for dancing and other purposes in case of the latter. This makes any system of finely divided air distribution, similar to those described in a previous article on church ventilation, out of the question.

For small and medium sized halls, where furnace or indirect steam heating is employed, the general methods

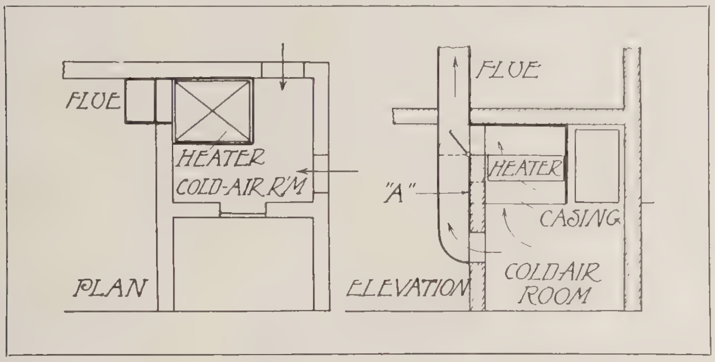


FIG. I.

and data already given in connection with church heating, apply equally well, except perhaps, the method of basing the various parts of the apparatus upon the number of occupants. With halls there is less uniformity in the relation between the exposed wall and window surface and the seating capacity; a hall often being simply a part of a building used for other purposes and having perhaps only one outside wall exposure. Again, there is commonly a wide variation in the ratio of floor space to cubic contents, which makes it better to treat the systems of heating and ventilation separately, basing the former upon the exposed wall and window surface, and the latter on the number of occupants. This same method is also applicable to churches where the proportion of exposed surface to seating capacity is out of the ordinary.

The heat units required per hour for warming a room of average wooden or brick construction may be found by the formula

(1) $H_1 = [(W \times 25) + (G \times 100)] \times E$

in which

H_1 = heat units required per hour.
W = outside wall surface, in square feet.
G = glass surface, in square feet.
E = factor for exposure, which may be taken as N, 1.32; E, 1.12; S, 1.0; W, 1.26.

When there is an unwarmed roof space above the ceiling, each 3 square feet of ceiling should be taken as 1 of outside wall, in applying the above formula.

The heat units required for warming the air for ventilation may be found by the formula

(2) $H_2 = (O \times C) \times 1.3$,

in which

H_2 = heat units required per hour.
O = number of occupants.
C = cubic feet of air per occupant per hour, which may be taken from 1,500 to 1,800.

The total heat units required for both warming and ventilating is the sum of the two quantities found above; or

$H_1 + H_2 = H_3$ = total heat units required per hour.

Having found the different values of H, other data may be determined as follows:

(3) $H_1 \div 250$ = square feet of *direct* radiation required for warming the room.
(4) $H_2 \div 700$ = square feet of *indirect* radiation required for ventilating the room.
(5) $H_3 \div 500$ = square feet of indirect radiation required for both heating and ventilating the room.
(6) $H_2 \div 1{,}500$ = square feet of steam blast coils for ventilation only.
(7) $H_3 \div 1{,}200$ = square feet of steam blast coils for both heating and ventilation.
(8) $H_3 \div 40{,}000$ = square feet of grate surface for furnaces or cast-iron sectional boilers.
(9) $H_3 \div 30{,}000$ = horse-power of tubular boilers.

If the room is heated and ventilated by indirect steam, add 1 square foot of grate surface to the boilers for each 100 occupants, to care for the aspirating coils in the vent flues. The flue areas for both supply and vent, in furnace and indirect gravity steam heating may be based on the number of occupants and made the same as for church heating, under like conditions. This also applies to cold-air supply ducts, both for furnaces and indirect stacks.

Tables of fan capacities already given, both of the centrifugal and disk types, apply equally well to the conditions of hall ventilation.

For furnace heating, the general arrangement of flues, with supply registers at each corner of the room, and vents at each end (one being in the front of the stage),

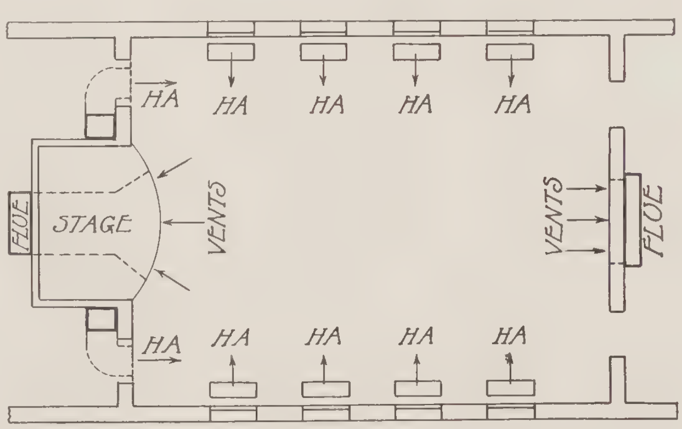


FIG. II.

is as satisfactory as any for halls of small size. This same arrangement may also be used in the case of indirect steam, supplementing it with supply registers along the outer walls beneath the windows in rooms of large size. The use of the cold-air rooms and multiple air-inlets should be retained if possible, as described for church heating. The method of locating one of the large corner heating stacks in the cold-air room, and the arrangement of casing and mixing damper is shown in

plan and elevation in Fig. I. The stack is hung from the ceiling in the corner of the room and enclosed in a galvanized iron casing with an open bottom which allows the air to pass freely between the sections of the heater. The cold air for the mixing damper is taken from a point near the floor, as shown, otherwise in mild weather, when the damper is set for nearly all cold air, the supply will become heated by passing across the *bottom* of the stack if the opening is made higher up, as at "A" for example.

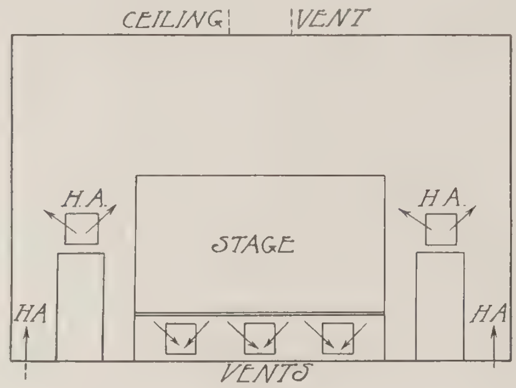


FIG. III.

A typical arrangement of supply and vent registers for a fairly large hall, heated by indirect steam, is shown in plan in Fig. II. In this case one-half the air supply is brought in through two large wall registers placed over the doors at either side of the stage, and the remainder through narrow floor registers along the sides of the room beneath the windows. If the outer walls are of sufficient thickness to carry an uptake flue these registers may be placed in the wall, instead of the floor, on account of cleanliness. This arrangement is often made possible by using a somewhat deeper window sill, and breasting out beneath it sufficiently to give the necessary depth for carrying the flue. A diagram representing a section through Fig. II, and showing the stage end of the room in elevation, is given in Fig. III. Part of the discharge ventilation is through registers or grilles in the front of the stage connecting with a flue in the rear, while the remainder of the air is taken off through a special flue at the opposite end of the room as indicated. In the case of small halls the necessary draft in the vent flues may usually be secured by the use of aspirating coils, but in larger rooms more positive results may be obtained by means of a discharge fan placed either in the attic or basement, as most convenient. A typical arrangement of an attic fan for the system shown in Fig. II is illustrated in Fig. IV. The two vent risers from the first floor are connected by horizontal ducts just above the ceiling with a fan chamber located at some convenient and central point. A direct-connected fan of the disk type is best adapted to this purpose on account of its light weight and ability to handle large volumes of air at low pressures.

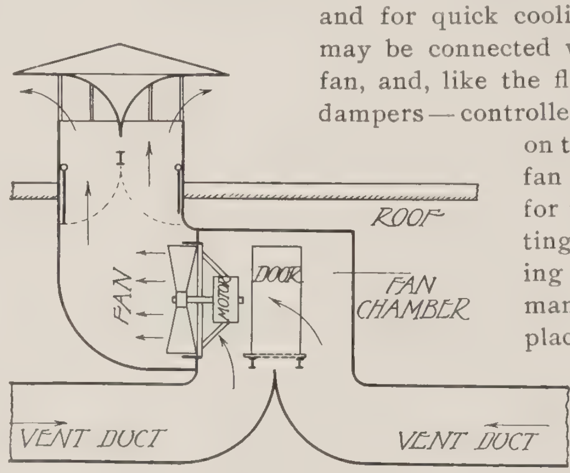


FIG. IV.

In the arrangement shown, the two horizontal ducts are brought into the bottom of the fan chamber by means of easy curves. The fan is placed in an opening in the side of the chamber with its shaft in a horizontal position, and discharges into an outboard flue provided with a hood and damper. If the attic space is limited as to height, the ducts may be brought into the sides of the chamber instead of the bottom, the fan and door occupying the two remaining sides. It will be seen by reference to Fig. III that ceiling vents are provided in addition to those at the floor. These are for use in mild weather and for quick cooling, should occasion require. They may be connected with the attic ducts leading to the fan, and, like the floor vents, should be provided with dampers — controlled from some convenient point, either on the first floor or in the basement. The fan and motor should be easily accessible for inspection and oiling, and a regulating rheostat should be provided for varying the speed to meet requirements. In many cases it will be more convenient to place the fan in the basement and connect the vent registers with the fan chamber by means of ducts beneath the floor. In this arrangement it is only necessary to carry a single vent uptake through the building, that leading from the fan outboard. In this case it is not possible to connect the attic vents with the fan, but this is not of so much importance because there is usually a good draft through these, due to the high temperature of the air at the upper part of the room. The duct from the ceiling vents may be connected into the fan discharge in the attic space, provided it is brought in on an angle with the direction of flow, so that the air from the fan flowing past the inlet will act as a suction. A common arrangement for a basement fan is shown in Fig. V. In this case the fan is placed directly in the base of the outboard flue, with its shaft in a vertical position. This reduces the resistance somewhat, as it does away with the 90° turn in front of

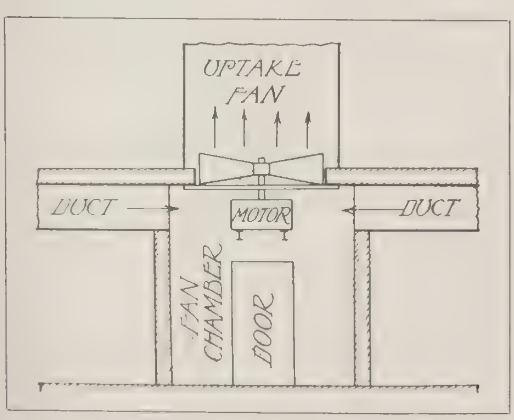


FIG. V.

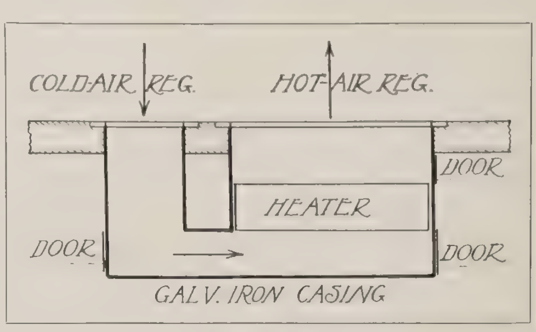


FIG. VI.

the fan shown in Fig. IV. On the other hand, the motor is more exposed to the weather, but this objection may be overcome by using one of the enclosed type and providing a good form of hood at the top of the flue.

The methods of determining the size of vent flues for fan ventilation has already been taken up in connection with churches and need not be repeated here. Before leaving the subject of gravity indirect heating, attention should be called to the necessity of providing means for air rotation, or inside circulation, for warming when ventilation is not required.

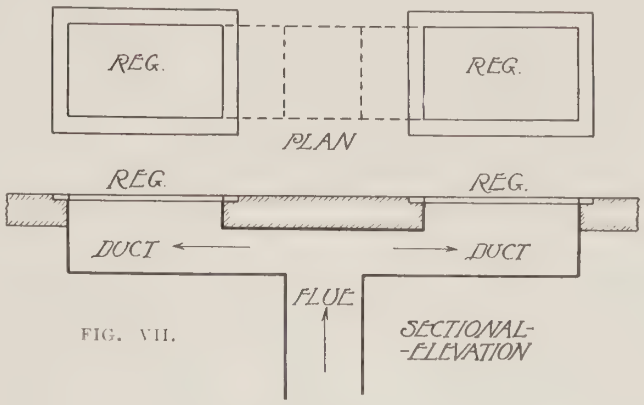


FIG. VII.

We now come to the treatment of large halls where a supply fan, usually of the centrifugal type, is used for providing the fresh air. In designing a system of this kind provision must be made for warming the room when the fan is not in use. There are various ways of doing this; one being to make the heating and ventilating systems independent, warming the room by direct radiation and making the main heater at the fan simply large enough for warming the air supply up to 70° in zero weather. By "direct radiation" is meant either the usual form of cast-iron sectional radiators which are placed in the room, or indirect stacks hung beneath the floor and arranged to take air from above as shown in Fig. VI. The ordinary form of direct radiator may often be concealed by breasting out beneath the windows sufficiently for enclosing the radiator, and providing grilles at the bottom and top to allow for a circulation of air over it.

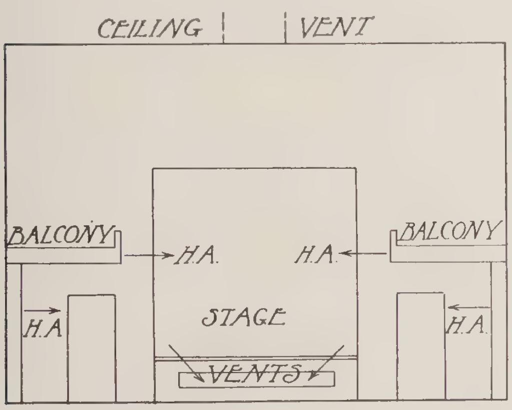


FIG. VIII.

When the main heater at the fan is proportioned for raising the total air supply through 70°, much of the time there will be more capacity than is needed for ventilation alone, and this surplus heat may be used toward warming the room and a portion of the direct radiation shut off. As the outside temperature rises, a point will be reached where the main heater will be sufficiently large to do both the ventilating and heating. If thermostatic control is placed upon the direct radiation this balance between the radiators and main heater will be maintained automatically. The main heater may be regulated partly by valved sections and partly by means of a by-pass damper, which if possible, should be automatically controlled. When the methods above described are objectionable, it is sometimes possible to make the main heater large enough to both heat and ventilate the room in zero weather, and divide it in two parts, placing one at each end of the basement near the bases of a pair of large flues. When both ventilation and heat are required, air is forced through these two heaters, by means of a fan into the flues; but when heat only is required, the air is admitted to the heaters from the basement by rotation, and passes upward into the room above by gravity, as in the ordinary form of indirect heating.

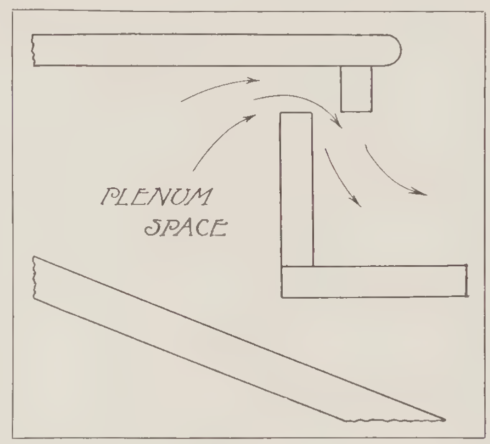


FIG. IX.

The method of air distribution differs from church heating because the floor must in general be kept clear, and all seats be removable. This makes it necessary to introduce the air in much the same manner as in gravity heating, that is, through a comparatively small number of large openings. Fig. II may also be used to illustrate a common method of locating the supply and vent registers for a fan system in which the heating is done by direct radiation (not shown).

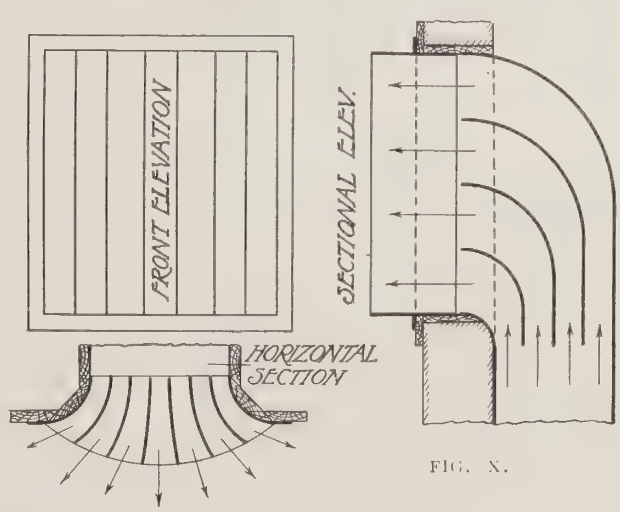


FIG. X.

The supply registers should be of practically the same size as for gravity heating, unless provided with diffusers, to be described later. The ducts leading from the fan to the flues may be based on an air velocity of 800 to 1,000 feet per minute, the lower velocity being in the smaller branches. In the uptake flues, the velocity should drop to about 500 feet in uptakes leading to floor registers, and 700 feet in those leading to wall registers which are placed at an elevation of 7 or 8 feet above the floor. In

the arrangement shown in Fig. II the vent flues may be made the same size as for gravity heating, but in general, no aspirating coils or vent fan will be required, as there will be sufficient pressure from the supply fan to force the air out. Exceptions to this would be in the case of large halls with deep galleries. When floor registers are supplied with air under pressure from a fan, it is well to place them in pairs and bring up the supply flue between them as shown in Fig. VII. This breaks the force of the current and causes the air to rise at a low and more uniform velocity over the entire surface of the register. In all cases adjustable dampers should be placed in the supply flues to equalize the flow of air to the different registers.

An arrangement which is used with good success in halls having a balcony upon two or more sides is shown in diagram in Fig. VIII. The air supply in this case is partly through wall registers placed about 7½ feet from the floor, and partly through registers in the front of the balcony. The lower registers tend to flush the space beneath the balcony with fresh air, while the body of the hall receives its main supply from the balcony registers. The discharge ventilation, for the most part, is through registers near the floor at either end of the room. Ceiling vents are provided for use on special occasion, as already described. No particular provision is made for the ventilation of the balcony. Where the hall is of good height the air currents induced by this arrangement of supply and vent registers will tend to change the air at frequent intervals in this portion of the room.

The ducts supplying the registers shown in Fig. VIII are carried in special pilasters for the vertical portion, and in the floor space of the balcony. When the air is supplied in this manner it is necessary to warm the room by independent means, usually by cast-iron radiators placed along the outer walls beneath the windows.

A method sometimes employed with good success is to use rotation heaters of the general form shown in Fig. VI for warming, and then connect the supply ducts from the fan with the casings beneath the heaters. The air can then be forced into the room without the use of additional floor registers. The effect on the heaters will be simply to increase their efficiency, and they may be shut off when their heat is no longer needed. Both registers become supply registers under these conditions and may be made of the same size. Sometimes the galleries of a hall, and even the main floor, in the case of lecture halls, are raised from the level; being in the form of a succession of broad stairs, each having one or more rows of seats. With this arrangement it is usually possible to utilize the space beneath as a plenum chamber and to introduce the air through slots in the risers as shown in section in Fig. IX. On account of keeping the floor free it is impossible to introduce the air in finely divided streams, as already stated. This makes it necessary to provide special means at the inlet registers to avoid unpleasant drafts, which are very likely to occur when air is introduced in large volumes at temperatures of 68 to 70°. A method of diffusing the entering air is shown in Fig. X. The vertical section at the right illustrates a series of deflectors placed in the flue back of the outlet into the room. These equalize the flow in horizontal planes, and a second set of vertical blades in front of these spread it in a fan-shaped stream as it enters the room. An arrangement of deflectors and diffusers of this kind takes the place of the usual inlet register.

When registers are already in place, drafts can often be done away with by placing a diffuser of the general form shown in Fig. XI over the register face. A system of ventilation, used more frequently abroad than in this country, is the *downward* system, where the air is introduced at the ceiling and

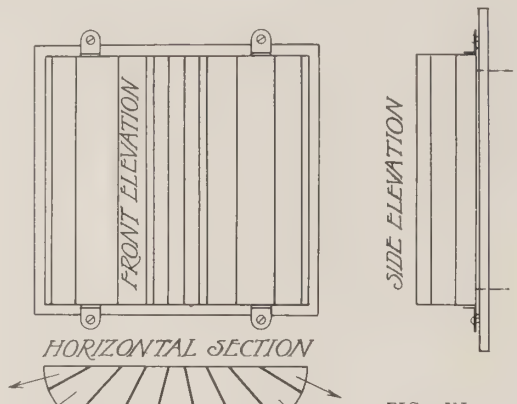


FIG. XI.


FIG. XII.

withdrawn at the floor level. This system is based on the theory that the warm air first rises to the upper part of the room, wherever it is admitted, hence it might as well be introduced at this point in the first place. The practical difficulty with this arrangement is that after a hall is once heated and filled with people, the animal heat given off is usually sufficient to maintain the desired temperature, and sometimes the temperature of the room will continue to rise even though no other heat be supplied. Under these conditions it becomes necessary to introduce the air at a temperature of 66 to 70° to maintain the proper conditions within the room. Air admitted through the ceiling at this comparatively low temperature is liable to fall quite rapidly and produce unpleasant drafts in different parts of the room.

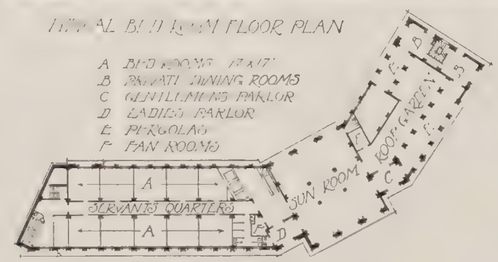
Symphony Hall, Boston, an interior view of which is shown in Fig. XII, has a system operated on the method above described. Air is introduced through grille work shown in the panels of the ceiling and is removed through wall registers at the floor level and in the first balcony. Certain of these registers can be seen in the front of the stage and projecting above the back row of seats in the first balcony. The fresh air is drawn from the top of the building to the basement through a special shaft, where it passes through a heating coil, and is then forced by two 9 foot centrifugal fans, having a capacity of about 70,000 cubic feet per minute, to the space above the auditorium ceiling, where it is distributed to the various grilles by means of iron ducts. The air is removed from the building by means of two 7 foot centrifugal fans, also located in the basement. There is no direct radiation in this hall, except a small amount in the second balcony, and it is necessary to run the supply fans for warming the room at all times, although when once heated up it will retain the heat for a considerable length of time.

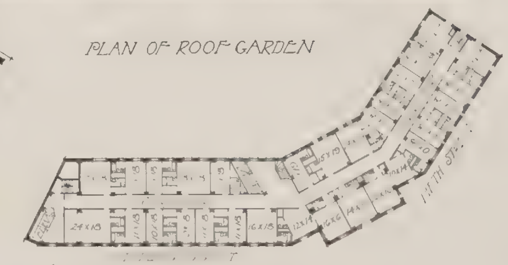
Plate Illustrations—Description.

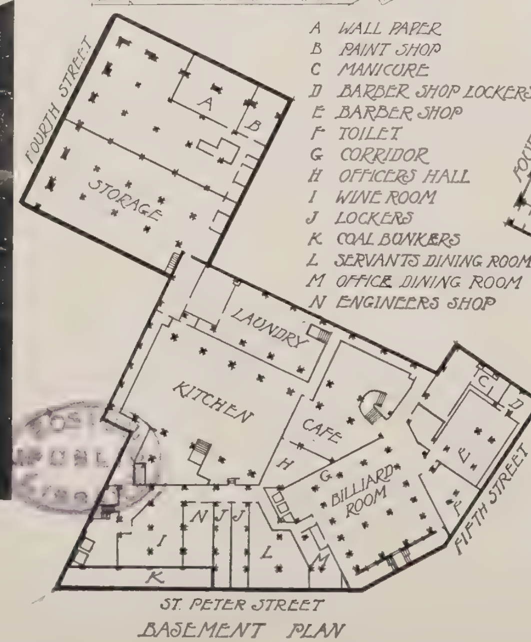
Houses, Charles River Embankment, Boston. Plates 57–59. This group of houses fronting the new Charles River embankment and the wide basin beyond possesses something of the charm of the old Colonial homes of Boston and other New England towns. The houses have been designed not as an experiment in co-operative living, but rather to evade the apartment house and give to each occupant a distinctive and permanent home. The lot originally purchased in 1909 was 230 feet long and 152 feet wide, representing an assessed valuation of $113,800. The plan calls for a group of 22 houses, a courtyard 52 by 190 feet with a central planting space, a back alley 10 feet wide, an arched passageway 20 feet for teaming, and an entrance 16 feet wide to the parkway for driving. All the houses are three stories high except those at the rear which have an extra story. The typical plan is 20 feet wide and 45 feet deep with story heights of 8 feet 6 inches; 9 feet 6 inches; and 8 feet, respectively. The heating systems are hot air and hot water, suiting the wishes of the occupants. The typical plan shows a long, well-lighted library, a single flight of stairs, a small passageway or lobby leading to the dining room in the rear, and a serving room receiving secondary light. The alternative plan has a small front room which gives space for back stairs and a serving room lighted from the yard. The latter scheme is very satisfactory on the 18 foot lot No. 21 — which keeps the general character and accommodations of the adjoining 20 foot lot with a saving of approximately $900 in the cost of construction. The back part of the roof is used for drying clothes, the front part being restricted by mutual agreement. The plan that varies most from the typical is No. 16 which has a section over the archway. This house has a front of 20 feet and the conventional arrangement of the three stories, but over the arched passage is a large studio two stories high with a gallery at one end. The floors may at any time be carried through the studio giving several extra rooms. The exterior is of red water struck brick with the sills, caps and trim around the windows and cornices of light buff concrete stone resembling limestone. The outside woodwork is painted to match the stone trimming. The shutters are dark green and the doors white, green and mahogany. The site is made land with piling from 10 to 25 feet deep. The framing is all of hard pine, the floors of red birch, oak and hard pine and the wood finish generally white wood for painting. The houses cover 18,967 square feet out of a total area of 36,893 square feet, and cost approximately $225,000.

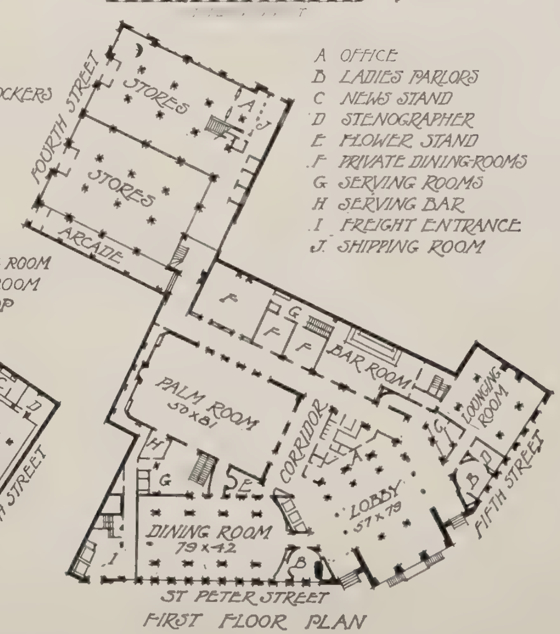
Yale Boat Club House, New Haven, Conn. Plates 60, 61. This building is built of red brick laid in wide joints and trimmed in terra cotta the color of limestone. The window quoins project slightly and the ornament has been concentrated in the gables, under the balcony rail on the river front and at the main entrance. This entrance is reached by means of a stone and brick arched bridge extending to the one over the Quinnipiac River. The roof is of slate. The pile foundations are covered with heavy stringers and protected by creosoted plank sheathing and surface filling. On the first floor is the entrance hall finished in light brick with stairs leading to the second story. Opening from the hall is the large boat room, beyond which is the workshop and the boiler room. Each of the six doors on the front has a run leading to the float which extends the entire length of the boat house. Upon the second floor is a large hall on the land side with a trussed ceiling, furnishing space for rowing machines, etc. The shower and drying rooms have slate lining and asphalt floors, while the toilet rooms are finished in marble. The lounging room has a brick and terra cotta mantel and a beamed and plastered ceiling between trusses. Doors open from the lounging room to the balcony, which is 36 feet by 56 feet and overlooks the river. The building contains approximately 410,000 cubic feet.

Church for St. Joseph's Parish, Dayton, Ohio. Plates 62–64. The exterior of this church is finished in iron gray brick, containing considerable purple to soften the general effect. The trimmings throughout are of









NEW ST. PAUL HOTEL, ST. PAUL, MINN.
Reed & Stem, Architects.

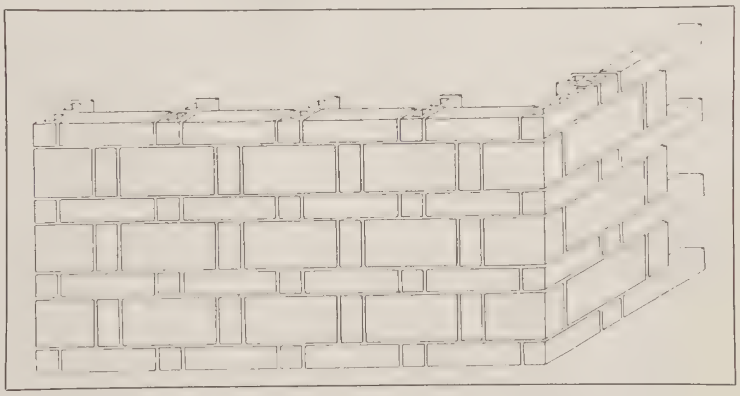
glazed terra cotta richly modeled, while flanking the main door-ways of the façade are tall columns of Vermont marble. A local stone of a very hard nature forms the base of the entire structure. The roof is of red tile and the exterior doors are of copper. The church is of Italian Byzantine design with a Basilican plan, the side aisles however being comparatively narrow and free of seatings. The nave which is 43 feet wide is ceiled by a barrel vault 45 feet from floor, with large semicircular windows in the clerestory and the apse semicircular in plan. The total seating capacity is 750. To the left of the wide vestibule in front is the baptistery with singing gallery overhead. Related to the aisles which are terminated at the sanctuary by niches are the confessionals, naturally lighted and ventilated. A suggestion of a cross axis has been contrived by bringing the tower into relation with a great niche on the opposite side of the church in which a marble Pieta is installed. Opposite to this semicircular shrine and within the walls of the tower is placed a minor choir gallery accessible from the tower stairs. Upon the interior the walls of the aisles up to the bottom of the windows are lined with tile of a soft green shade striped with thin horizontal lines of a slightly varying tone. The entire floor of the auditorium is laid with marbleized fiber which is of the monolith type. This is a greenish-gray field and in the aisles is bordered by broad simple masses of black. The sanctuary and its approaches are of marble and mosaic. The vacuum system of heating has been employed. Warm air is brought in near the entrance and is taken out by gravity at the tower. The cubical contents of the building is 577,600 feet and the cost per cubic foot 13 cents.

Church at Newton Upper Falls, Mass. Plates 65–67. The exterior design of this church was influenced by the Italian work, the portico being modeled after the Temple D'Auguste at Pola in Dalmatie. The sculpture in the pediment represents the miraculous appearance of the Blessed Virgin Mary to a French peasant girl. The campanile is of brick and cast stone — 125 feet from grade to top of tile roof and 15 feet square at base. The sides taper 4 inches in the entire height of the tower. There are four dial clocks with arrangements for chimes. Upon the interior is an open wood trussed ceiling. The decorations are in strong Pompeian colors. The stained glass panel over the vestibule doors and the twelve large windows are symbolical of Biblical scenes. The altar is of white marble with Numidian and Sienna columns and pilasters. The altar rail is of red Numidian marble on metal standards with gates ornamented in ecclesiastical symbols. The seating capacity of the basement is 450, the main church 800 and the gallery 100. The building, complete, cost approximately $80,000. There are 428,700 cubic feet, making the cost 18⅔ cents per cubic foot. The cubical contents were taken from the outside measurements of walls and 1 foot below floor to a point half way up pitch roof and includes portico, campanile, finished basement, etc.

New St. Paul Hotel, St. Paul, Minn.

REED & STEM, ARCHITECTS.

THE new million dollar St. Paul Hotel, at St. Paul, Minn., is the first building in this country to be built with exterior walls of interlocking machine-made terra cotta hollow blocks. All the stories between the second and ninth floors are built of this material. The blocks are of an old gold color, and are provided with projections which close the horizontal openings of the stretcher block, thereby making it impossible for the mortar joint to fall out. Being of the interlocking type they enormously increase the side pressure which a given wall will stand. This type of block demands a Flemish bond of one vertical and one horizontal alternating. The horizontal block is made from two to four times the length of the vertical. Large as well as small units can be made which enable the architect to carry out unique and original design. In combination with architectural terra cotta, this material is capable of giving strikingly beautiful effects at a reasonable cost. The blocks being much lighter than bricks are particularly well adapted for use in high buildings, where the weight of the walls is carried by steel or concrete piers — also for partition walls where great resistance against side pressure is wanted with a minimum weight.



SECTION OF WALL SHOWING INTERLOCKING BLOCK CONSTRUCTION.

The distinctive feature in this work is in the alternating use of a block with horizontal and vertical openings. The blocks with the vertical openings have locks on both sides which project into the horizontal openings of the stretcher block.

The size of the block used in this hotel is 8⅛ by 16¾ inches, with an interlocking block of 4 by 8⅛ inches for one course, and for the other course a 4 by 16¾ inch stretcher, with a 4 by 4 inch interlocking block. This 4 by 4 inch interlocking block extends 8 inches backwards, thus bonding with the backing brick or tile. This method of bonding is not absolutely necessary since ordinary wall ties will answer the purpose.

The advantages of this material for large structures are obvious on account of the extreme lightness in weight. If a building is properly spaced no cutting is necessary, although the blocks cut easily.

Editorial Comment and Miscellany.

WE WISH to call the attention of our readers to a series of three articles, the first of which appears in the present issue. They treat of certain fundamental considerations affecting the study of economical planning and construction of schools. Mr. Sturgis, who contributes the articles, served the city of Boston for some years on the commission which has charge of its school buildings, and during those years not only came in contact with others who were engaged in similar work in this country but also had opportunity to see something of the school work of other countries.

The subject is treated from a point of view that is somewhat novel as applied to schools, and yet is clearly fundamental, and is simply the application to school problems of what is a commonplace in the study of business problems.

An owner planning an office building would study first the floor plan to assure himself that he had all the available rentable area that was consistent with good service, elevators, stairs, corridors and toilets. These papers show the same study applied to schools to produce a compact plan, and for the purpose of eliminating space that is not necessary; on the broad ground that it is better to eliminate 30,000 useless cubic feet costing 22 cents a cubic foot than to save one cent per cubic foot by poorer material or construction in 600,000 cubic feet of school building.

The articles are largely suggestive and do not pretend to bring such study to definite conclusions, but they should lead the way to more thoughtful planning of schools, especially of those that are planned to meet the varied requirements of secondary education.

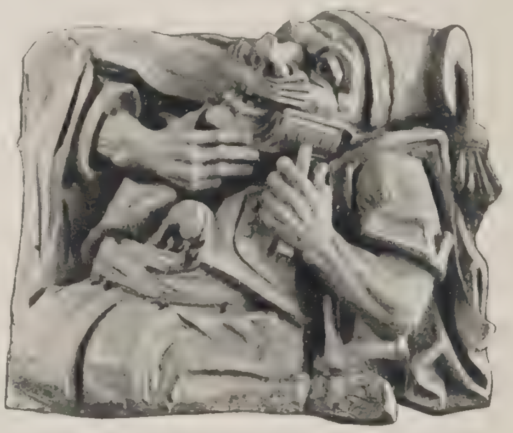
Economical school planning is often spoken of as if it were solely a matter of cost per cubic foot, without regard to what is contained within the walls. The present articles are intended to suggest the lines along which study might be made to determine what should be contained within the walls of a modern school. The first article treats of the requirements of elementary schools, the second of secondary schools, and the third treats of questions of hygiene as bearing on construction, and the final tests of economy.

EXTERIOR DETAIL OF FITZGERALD BUILDING, TIMES SQUARE, NEW YORK CITY.
Executed entirely in white mat glaze terra cotta by the Atlantic Terra Cotta Company.
Geo. Keister, Architect.

DETAIL BY A. L. DORR, ARCHITECT.
Made by American Terra Cotta & Ceramic Co.

DOME OF ST. JOHN THE DIVINE, NEW YORK CITY.

THE large Guastavino tile dome which covers the nave of the Cathedral of St. John the Divine, New York City—an interior view of which is shown in this issue—is one of the four great domes of the world constructed of masonry. It is 135 feet in diameter, measured across the lower part of its spherical surface. The thickness of the dome is 7½ inches at the base and decreases to 3¾ inches at the crown. Approximately one hundred



CORBEL TO BUTTRESS PANELS, FACTORY BUILDING, NEW YORK CITY.
Executed by the South Amboy Terra Cotta Company.
Shire & Kaufman, Architects.

DETAIL FOR HEARST BUILDING.
Executed in polychrome enamel terra cotta by Northwestern Terra Cotta Company.
James C. Green, Architect.

thousand tiles were used, measuring 6 inches by 1 inch with their length varying from 15 to 18 inches. The dome weighs approximately 50 pounds per square foot, with a total weight of 500,000 pounds. All portions of the dome were at all times self-supporting and no false work or centering was built to hold up the dome during its construction.

INTERLOCKING TERRA COTTA HOLLOW BLOCKS.

THIS material, which was used in the construction of the new St. Paul Hotel, at St. Paul, Minn., has been patented by F. Koch, President of the Twin City Brick Company, and a factory devoted entirely to its manufacture has recently been erected at St. Paul. The blocks are made in old gold, olive green, bronze brown, and mottled colors. Owing to the lightness of their weight, they can be delivered at a reasonable price in any part of the United States. The cost of laying is somewhat less than that of ordinary face brick. In addition to the St. Paul Hotel, they have been used in several other types of buildings, including houses, both large and small. A special rose-tinted tile is now being made which is suitable for interior wainscoting. The interlocking device gives a firm bed for the joint and strengthens the partition wall. Spacing sheets showing dimensions of piers and openings enabling the architect to space his elevation will be furnished by the manufacturers on request.

DETAIL BY J. N. PIERSON & SON, ARCHITECTS.
Made by New Jersey Terra Cotta Company.

PENNSYLVANIA BUILDING LAWS REVISED.

AT THE annual meeting of the Pennsylvania State Association of Architects, held at Harrisburg, May 2d, resolutions were adopted regarding the appointment of a commission to revise and codify the building laws of the State. The Association deplored the unsystematic and fragmentary character of the Acts of Assembly with reference to the construction of buildings and the safeguarding of life and property. They endorsed the Joint Resolution introduced into the Senate providing for the appointment of a commission to investigate the

INTERIOR OF DOME, CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK CITY.
Showing dome of Guastavino construction.
Heins & LaFarge, Architects.

CITY INVESTING BUILDING, BROADWAY, NEW YORK.
Terra Cotta furnished by the New York Architectural Terra Cotta Company.
F. H. Kimball, Architect.

manner of construction of buildings in the Commonwealth of Pennsylvania, and to determine the strength and character of materials in order to safeguard the health and life of persons occupying the same, and to codify the laws in relation to buildings.

RESTORATION OF OLD CONGRESS HALL, PHILADELPHIA.

SIXTY THOUSAND DOLLARS has been appropriated for the proper restoration of old Congress Hall, Philadelphia, and for erecting memorial lamps in Independence Square. The work will proceed at once with drawings from data collected by the Philadelphia Chapter of the American Institute of Architects. In the absence of any original plans this data was obtained by digging up floors, tearing away parts of walls, probing ceilings, and scraping away plaster, to ascertain where partitions and stairways were erected as the building originally was designed. In addition to this, historical accounts of how the interior was arranged have been examined.

WOODWARD BUILDING, WASHINGTON, D. C.
Exterior of gray Norman "Craftsman" brick, laid in Flemish bond, furnished by the Pearl Clay Products Company.
Harding and Upman, Architects.

FIREPLACE OF "TAPESTRY" BRICK.

IN GENERAL.

H. S. Bill, architect, New York Life Building, Kansas City, Mo., desires manufacturers' catalogues.

Wheelwright & Haven have formed a partnership with Edward H. Hoyt and will continue the practice of architecture under the firm name of Wheelwright, Haven & Hoyt; Offices, 220 Devonshire street, Boston.

The new plant, Number 2, of the Western Brick Company, at Danville, Ill., is now in full operation, producing a line of mat faced and flashed brick.

Fiske & Co., Inc., have removed their New York office to the Arena Building, 32d street, one door east of Broadway. Here they have installed a most remarkable exhibit of their full line of brick.

The American Terra Cotta & Ceramic Co., of Chicago, have

removed their offices from the Chamber of Commerce Building, to Peoples Gas Building, Michigan avenue.

In a booklet recently issued the Atlantic Terra Cotta Company show their new line of Garden Pottery, etc., including vases, window boxes, sun dials, pedestals, and bench legs. The booklet contains not only illustrations of a large variety of types, but the sizes, colors, and prices are also given.

DETAIL FOR HOSPITAL.
Executed by the Conkling-Armstrong Terra Cotta Company.

The New York office of the Hartford Faience Company has been removed to 4 East 42d street.

The brick used in the two houses at Pittsburg, Pa., MacClure & Spahr, architects, illustrated in this issue, was furnished by Fiske & Co., Inc.

HOUSE AT DULUTH, MINN.
Brick furnished by the Ironclay Brick Company.
W. A. Hunt, Architect.

The tile used upon the interior of the Church for St. Joseph's Parish, Dayton, Ohio, illustrated on Plates 62–64 in this issue, was furnished by The Rookwood Pottery Company.

The terra cotta used in the Church for St. Joseph's Parish, illustrated in this issue, was furnished by the Atlantic Terra Cotta Company.

A. L. Dorr, Minneapolis, has formed a copartnership with his son, William Grey Dorr, for the practice of architecture, under the firm name of Dorr & Dorr, Offices 1132 Lumber Exchange.

Work has been started on the Hotel McAlpin, Broadway, between Thirty-Third and Thirty-Fourth streets, New York City. This building will be twenty-five stories high. F. M. Andrews, the architect, estimates that the total cost will be approximately $14,000,000.

HOUSE AT ST. LOUIS, MO.
Exterior of red pressed brick, furnished by the Hydraulic-Press Brick Company.
Wm. A. Lucas, Architect.

COMPETITION FOR A SMALL HOUSE TO BE BUILT OF NATCO HOLLOW TILE.

Cost of House not to Exceed $6,000.

FIRST PRIZE, $300. SECOND PRIZE, $200. THIRD PRIZE, $150.
FOURTH PRIZE, $100. MENTIONS.

PROGRAM.

THE problem is a small detached house to accommodate a family of four with one maid. The outer walls and foundations of the house are to be built of Natco Hollow Tile.

The location may be assumed in any town, small city, or suburb of a large city.

The cost of the house — exclusive of the land — shall not exceed $6,000. The method of heating, the plumbing, other fixtures, and finish, to be governed by the limit of cost.

Many houses of this type of construction have recently been built in different sections of the country, and from the data which has been gathered concerning the cost of a large number of these houses, an average price per cubic foot has been obtained. This cost is given as the basis upon which the size — figured in cubic feet — of each house submitted in this Competition must be approximated. The price is 20 cents per cubic foot.

Measurements of the house proper must be taken from the outside face of exterior walls and from the level of the basement floor to the average height of all roofs. Porches, verandas and other additions are to be figured separately at one-fourth (25 per cent) of their total cubage. The cost of porches, etc., is to be included in the total cost of the house ($6,000).

On this basis of figuring — the number of cubic feet multiplied by the cost per cubic foot — the jury will not consider any designs which exceed the limit of cost.

There are no restrictions as to the shape and style of the house or the size and location of the lot.

The particular object of this Competition is to encourage the study of the possibilities in the use of Natco Hollow Tile in the exterior walls of houses. Here is a durable material which will insure a house being warmer in winter, and cooler in summer; easily meets in all respects the demands of the designer, and gives to the house that permanent value which is lacking in the more perishable materials. A house can be built of this material at very little more cost than one built of wood, or of plaster on wire lath and stud The walls are knit together as solidly as if built of stone. The cost for up-keep is nothing. Any mason of average ability can easily do the work.

CONSTRUCTION.

The following suggestions are offered as being practicable and admissible.

First. Outside walls may be of Natco Hollow Tile 8 inches thick (8 inches by 12 inches by 12 inches). Foundation walls, below grade, should be not less than 12 inches thick. The blocks being heavily scored on two sides, stucco may be used for an outside finish and plaster applied direct to the block for interior finish.

Second. The walls may be built double using in the outside wall a 4-inch hollow tile, and on the inside a 6-inch tile. The treatment of the face of such a wall, and the manner of bonding the outer and inner walls are left to the designer.

The floors and roof need not be of fireproof construction.

DRAWING REQUIRED (there is to be but one).

On one sheet a pen and ink perspective, without wash or color, drawn at a scale of 4 feet to the inch. Plans of the first and second floors at a scale of 8 feet to the inch A section showing construction of exterior wall, with cornice. A sketch showing detail of front entrance. In connection with the plan of the first floor show as much of the arrangement of the lot in the immediate vicinity of the house as space will permit The plans are to be blocked in solid. A graphic scale must accompany the plans. The character of the exterior finish must be clearly indicated on the perspective and detail.

The size of the sheet is to be exactly 34 inches by 22 inches. Strong border lines are to be drawn on the sheet 1 inch from edges, giving a space inside the border lines 32 inches by 20 inches. The sheet is to be of white paper and is not to be mounted.

The drawing is to be signed by a *nom de plume* or device, and accompanying same is to be a sealed envelope with the *nom de plume* on the exterior and containing the true name and address of the contestant.

The drawing is to be delivered flat, or rolled (packaged so as to prevent creasing or crushing), at the office of THE BRICKBUILDER, 85 Water Street, Boston, Mass., on or before June 26, 1911.

Drawings submitted in this Competition are at owner's risk from time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The designs will be judged by three or five members of the architectural profession representing different sections of the country.

First consideration will be given to the fitness of the design, in an æsthetic sense, to the materials employed: Second — the adaptability of the design, as shown by the details, to the practical constructive requirements of the material.

Drawings which do not meet the requirements of the program will not be considered.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. The full name and address of the designer will be given in connection with each design published. Those who wish their drawings returned, except the prize drawings, may have them by enclosing in the sealed envelopes, containing their names, ten cents in stamps.

For the design placed first there will be given a prize of $300.
For the design placed second a prize of $200.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

This Competition is open to everyone.

The prize and mention drawings will be published in THE BRICKBUILDER.

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LETTERPRESS

CHURCH—LAS RECOJIDAS,
SAN LUIS POTOSI, MEXICO.

Polychrome decoration of dome is composed of green and yellow tiles; the ribs are of stone.

Compton Wynyates.

BY ARTHUR G. BYNE.

THE fact that Compton Wynyates lies eight miles from the nearest stations of Kineton or Banbury should not deter any architect from visiting it. It is England's finest brick manor house, and its being sequestered in the rural depths of Warwickshire adds much to its charm, if not to its accessibility. In the unbroken tranquillity that pervades the spot one can forget railroads, and lapse back into the atmosphere of the early sixteenth century days when Compton was built.

Over the knolls that hide the house from view until you are almost atop of it, you can fancy the procession of donkeys coming that, according to tradition, brought in panniers much of the building material from the dismantled Fulbroke Castle fourteen miles away. Not far from the rising walls, you can picture the primitive kilns — for most of the present level was secured by converting the nearby eminences into bricks. Then there were diggers digging the moat (filled up last century when the family thought Compton too damp in winter); and wood-carvers preparing the elaborate barge-boards (though their work has now worn almost flat); and stonecutters fashioning the local yellow stone into the required mouldings and facings. It was all a busy, bustling scene then, and as for any inroads of modernity disfiguring their quaint work, Compton might have left the builders' hands but a decade ago.

Besides its great beauty, for time could lend a certain beauty to even a commonplace structure, Compton possesses an unusual amount of architectural interest. Built after fortified keeps were no longer a necessity, it was still cautious enough not to tempt Providence too far; and for that reason retained the moat, and the embattled towers of earlier days, and besides, more secret hiding places and staircases for refuge and escape than any other house in England (seventeen complete flights of stairs and odd three and four steps everywhere). Driving down the slope from Kineton, the best means of approach, the house looks very domestic, owing to the immense roof expanse, most probably; but seen from the level, where its battlemented towers rise to a great height, it looks grim and formidable.

Both inside and out everything is, as Mr. Gotch says, "as irregular and picturesque as the most romantic could desire." There are towers here and there, projections and indentations, gables of different heights, few windows that are placed over others, and then the whole mass fitly surmounted by the most remarkable chimneys in the Kingdom; from the highest point, as I approached it, forty could be counted, and many more, no doubt, were hidden from view — forty chimneys of different designs, all of carved and moulded brick, fluted, zigzagged, circular, octagonal, corkscrew and combined corkscrew and fluted; most of them supposed to have already stood for a hundred years on John of Bedford's castle in Fulbroke Park, before being brought to Compton. If this story is true, it may easily be assumed that they determined the material for the newer structure — the same small red brick with wide mortar between; unless, as some local historians maintain, Sir William, Henry VIII's favorite, merely added to an earlier struc-

SOUTHWEST VIEW.

ture. Whether this earlier rectangular structure was built in Henry VII's or Henry VIII's day, it was the nucleus of the whole — a plain square building around a similar courtyard (marked black in the plan). It was typical of houses of the period, and persisted somehow to assert itself through all the additions of successive owners. There was perhaps a second court with a drawbridge in front of the present house — a belief strong in the Compton family long ago, though there is now no trace of it. This original determining squareness, along with the fact that one material, brick, predominates throughout, from the plain underpinning to the top of the elaborate chimney stacks, make of Compton a most alluring and harmonious ensemble.

Looking at the exterior in detail, the main entrance porch is to my mind the most striking motif, with its broad central archway with the arms of Henry VIII over it (for as we have said, Sir William, who if not actually the first builder of Compton, certainly considerably aggrandized it, was throughout his life a great favorite of that fitful monarch). The stone used here is subservient to the brick, and placed as it is with Gothic indifference to arrangement or structurability, it seems a part of the brickwork. Not only is this porch accentuated by its stone trimmings, but also by being made to project some distance from the main façade. The next important features of the front are the two gables unequal in plan and superstructure, and showing in their upper portions the most amusing specimens of brick nogging — every shape of brick laid up helterskelter. The primitive appearance of this nogging is enhanced by that of the much twisted and warped half-timber enclosing it, and by the now blackened bargeboard. Between the inner side of this board and the face of the gable, a distance of some 12 inches, can be seen the under sides of the old slates and tiles held merely by being pegged to the roof battens.

GROUND FLOOR PLAN.
Solid walls indicate original work.
Dotted walls show later additions.

In spite of these interesting features of the façade, the front can hardly be deemed Compton's best viewpoint, such a rambling, unsymmetrical composition being better appreciated from an angle — the southwest, in this case, as that takes in the beautiful chapel window and Elizabethan sundial above. There are several marked incongruities in the front, such as the unstructurability of the great brick parapet "lapping" over onto the gable; also where it was found that the tall towers cut off the draft from the lower chimneys, the method of heightening these would hardly be approved of nowadays. But one would have to be an architectural crank to find fault with such small defects. At any point the house is unsually beautiful. The exquisite coloring of the brick, the lichen-covered roof, the broad lawns over the filled-in moat and the curious old-fashioned flagged paths in front, the unfilled portion of the moat at the back nearly surrounding an old garden, the yew hedges, the roses, all make a picture that forbids fault-finding.

As a study in that artistic kind of brickwork that originated in the Low Countries and came across the Channel to Southern England, Compton Wynyates has no rival. The bricks are in texture very like our over-burnt bricks of to-day, warped and twisted. In color they resemble those of Sutton Place (previously described in The Brickbuilder) — salmon fading to buff, or deepening into sparkling bronzes with bluish patterning, 9¼ by 2¼ inches throughout, and the wide joints are of coarse cream-colored mortar. The diamond patterning is not all over, having been omitted in many parts — purposely I should say, since such parts show no traces of being later work. Curiously enough, the originally bluish diamond shows up a light yellow in most spots, as if the headers forming it were really lighter in color than the body brick. On close examination one discovers why: The bricks for the pattern had their ends dipped into some blue coloring matter before being burned, and this coloring substance has since caused the end to disintegrate to the extent of a quarter of an inch, thus disclosing the light body. Of course, this has happened only in the most exposed surfaces, and though it would be considered a serious defect in present-day brickmaking, in the case in question it only adds one more charm to the walls. Wherever, as in the more sheltered places, the coloring matter has not played false, it is of a soft bluish tone that faintly suggests, rather than sharply outlines, the diamond. The rich mellow color of the house is the richer for the patches of deep green ivy that discreetly hide and reveal the right proportion of wall space.

Beautiful though the entire surface is, it is the marvelous chimneys that are the bricklayers' triumph at Compton. Not only are they *tours de force* in the use of brick, but they play a most helpful part in the composition and the silhouette. They exhibit, as mentioned, an astonishing variety of shapes, a few are rectangular or circular, a few indescribably fantastic, and the majority octagonal, with their eight sides sometimes concaved or ribbed. In no instance has terra cotta been used in shaping the stacks, though in many places a terra cotta trefoil or rosette has been inlaid. This means that for all this elaborate shaping the bricks have been cut or moulded. In the case of the spiral stacks it is not unlikely that they were first built up as perfect cylinders, and afterwards chiseled out screw-fashion. Their making must remain, however, a matter of conjecture, for unfortunately, neither at Compton nor at Barsham Hall, where also the chimneys are famous, have any of the old building documents been discovered. The closest examination will not reveal the secret, for the bricks are too weathered to exhibit any marks of the tool. The coupled and tripled stacks are built up with 4 or 6 inches between

WEST VIEW.

SOUTHEAST VIEW.

COMPTON WYNYATES, ENGLAND.

the shafts, which makes, it is true, a more amusing silhouette, but, as discovered long ago, it is very detrimental to the chimneys' *raison d' etre* — a perfect draft; for the cold air thus enabled to completely encircle the stack, chills the flue and causes a downward or back draft. Such discomforts were so frequent in the Elizabethan days as to pass unnoticed, but in the following century, when the inmates were more particular, the pulling down of these separated flues was seriously considered, but, happily, abandoned.

Passing under the arms of Henry VIII, and the Dom. Rex. Henricus Octav, one lingers in the archway, with its worn stone benches, to find out what all the doors and niches there were ever meant for. There are oak doors on each side that lead to the moat; on the left another door to the porter's lodge and the niche through which he carried on communication with the house: then a spy-hole, now blocked up, and a circular staircase to the turret. This staircase is worth climbing to examine the splendid split-oak panels of the turret guard-room, and the fine ceiling which Spencer the second earl had built, and which fortunately was not damaged by the Puritan's fire, when they held the manor. The finely designed iron lamp holder that came from Fulbroke also deserves some attention before passing on to the interior court.


GATEWAY.

Of this quadrangle every feature is unchanged, except for the comparatively new flag stones. It is here that the old blue diamond patterning in the brickwork has been best preserved. A closer view also of the chimneys and of the stone slab roof is obtained from here, and the charming little dormers that have weathered so many winters reveal all the frank unfinish of their roughly hewn oak frames, their stone roofs and their plaster tympanums. Owing to the protected situation of the windows giving on the court, the chief, of course, being the grand bay of the Hall, most of them still hold their original Tudor glass. Another attraction before leaving this spot is the lead conductors. They are plain save for a little decoration on the head; the conductor, in 4 foot lengths, one wedged into the other, is fastened to the wall by a lead band, one end of which after being riveted to the brickwork, is passed over the pipe and riveted again, and finally folded back on itself, thus covering the rivet heads.

On the opposite side of the court to the archway, but not on axis with it, is the entrance to the Hall through the screens. The door to this entrance is a fine old linen fold example, bearing marks of long service, but the low dark passage it leads into, having been roofed over for warmth, and being actually choked up with hat and umbrella stands, seems a most unfitting approach to the lofty spacious hall beyond. On the left of the passage or "screens" are the buttery, the kitchen passage, and a staircase; on the right the Hall (from the upper end of which access is obtained to the family rooms), the chapel and the beautiful, spacious, Elizabethan staircase. The doors opening into kitchen and buttery are new, but all those with the linen-fold pattern are old; the one leading to the Hall, and having in addition to the linen panels, one illustrating the deeds of an early Compton where knights are slaying and being slain in most extraordinary attitudes, is a most interesting piece of Gothic carving.

The Hall is a plain room, but structurally very interesting. The walls are simply plastered and extend, like in all old halls, to the full height of the house. At the top is a richly carved cornice from which spring the finely moulded beams of an open timber roof. Roof and cornice are said to have been brought from Fulbroke and certainly show signs of having been reduced to fit the smaller Compton Hall. Severe though the plaster walls are, and unpretentious the fireplace, the magnificent bay and the carved oak screen with the mellow half-timbered walls of the minstrel gallery rising above and back of it, form enough enrichment to make any English hall sufficiently impressive. It makes one shudder to think that this entire end of the apartment had been plastered up and painted white from Georgian days until a few years ago. Whether the so-called minstrel gallery ever held many musicians or not may be questioned, but certainly it offered an excellent opportunity for the repressed ladies of bygone days to witness the revelry going on below.

Another instance of special consideration shown them by the Gothic architects is in the drawing-room. This is over the present dining-room (which adjoins the Hall and holds, *en passant*, a very fine Chippendale mantelpiece put in by the fourth earl, and a good plaster ceiling). The drawing-room in question is enriched by handsome

QUADRANGLE.

BANQUETING HALL.

COMPTON WYNYATES, ENGLAND.

oak paneling (including an over-mantel brought by the Spencer heiress who married Sir William's son from her father's place, Canonbury Tower) and as the lower panels open like doors, the ladies of the family could sit comfortably by the fire, and hear the service going on in the unheated chapel below. This beautiful paneling was also recently cleared of its Georgian white paint.

There are scores of rooms at Compton — far more than present-day needs would require. Most of them have never been refurnished since the days when the eighth earl was obliged to sell their contents. But that comparatively small portion of the house which has been rehabilitated shows a skilful and sympathetic understanding of the atmosphere of an Elizabethan mansion.

The personal side of Compton Wynyates' story is very interesting without being as shockingly tragic as the stories of many English manor houses. It has the rare distinction of having remained in the same family, by direct succession, from its erection until the present moment. Sir William is the first builder of whom we have authentic record. He had been a ward of the Crown, and at his death in 1528 held manors in twenty-one different counties. Castle Ashby, in Northamptonshire, was the richest of these. As we have seen, he received early in Henry's reign, permission to pull down a royal castle at Fulbroke, and to use the materials for his own house (whether new or enlarged we are not told) at Compton Wynyates; but we know that the building must have been of considerable dignity by 1519, for in that year he was allowed to enclose his "lordly house" in 2,000 acres of good English farm land.

The Compton wealth was greatly added to when in the next reign the heir of the family eloped with the greatest heiress of her day — the only child of the merchant prince, Sir John Spencer. He long refused to forgive young Compton, who had in the guise of a baker delivered the rolls one morning at Spencer's house and went off with the dainty little lady in his baker's basket. But when Queen Elizabeth next year invited Sir John to stand sponsor along with herself to the Compton baby, he could not refuse. Like a proper grandfather he grew inordinately fond of his grandson, who had been wisely named Spencer, and left him his entire fortune of £300,000, a colossal sum in those days. Sir John's beautiful country house at Islington was also part of the inheritance, and from its gatehouse, Canonbury Tower, came some of the fine carving and paneling that later adorned Compton Wynyates.

Not parental adulation, nor royal favor, nor enormous wealth seemed to have spoiled this exemplary young Spencer Compton, for his contemporaries agree in pronouncing him "a most brilliant scholar, and a most accomplished gentleman." What is still more convincing, his enemy, Oliver Cromwell, used even nicer adjectives, and a man had to be a man indeed before Oliver admitted it.

Spencer's father had been created Earl of Northampton by James I, whom he entertained at Compton, and so when a "people's party" was formed, Spencer was naturally a royalist, and his house became a battleground of opposing factions. In 1644 the Cromwellians, with 400 foot and 300 horse, took the old brick manor and kept it until 1646. In the meanwhile they removed eighteen loads of furniture, all the horses, sheep and cattle, and £5,000 in money. Spencer was at this time off with his regiment (in which were his three sons) aiding King Charles; but the fourth son, who had wept because he was too young to accompany the others, helped his mother to hide, up under the roof, a number of wounded royalists who had taken refuge at Compton; under the very nose of the Puritans these refugees were secretly nursed and cared for by Lady Northampton, until they could escape by one of the many underground exits known only to the family. Over the fireplace in the guard-room of the entrance porch, they will still show you the wood all blackened by a fire started by careless Puritan soldiers.

This guard-room they never thoroughly investigated during two years' occupancy, for they never discovered the door in the chimneys, nor the one in the paneling that leads to a tiny room with a trap door over a well hole, nor the one to the "Priest's hiding-hole" under the roof.

Spencer Compton was killed at the battle of Hopton Heath. Oliver allowed James, Lord Northampton, to retain his father's estates on payment of heavy fine; but James seems to have still had wealth enough to make many alterations as well as to repair the ravages of war. He changed the original pointed arched windows into square tops with plain mouldings, and a transom of darker stone. George, the fourth earl, replaced some of these windows by the sashes of his day, but these were recently reconverted into casements. George was succeeded in 1727 by another James, who added a number of good rain-water heads; but, to his discredit, he also prepared the walls for papering, and hid all the fine Gothic chimney-pieces under slabs of classic marble. What woodwork he did not hide, was painted white.

But it was Spencer the eighth earl who nearly ruined Compton Wynyates, and for a reason so idiotic as to be incomprehensible — at least to an enthusiastic architect. This was in 1768. He and Lord Halifax, having sworn that their candidate for the county should be elected at any cost, spent every penny in election eating and drinking for their constituents. Lord Halifax was ruined. Lord Northampton, after paying out £130,000, was still in debt, and had to cut down acres of timber, sell most of the furniture at Castle Ashby and all at Compton, and to spend the rest of his life in a cheap inn in Switzerland. As he could not keep Compton in repair, he left orders that it should be torn down. But luckily, his faithful steward disobeyed. Instead he economized by renting out one wing as a farmhouse, and by bricking up, in order to lessen the window tax, all but thirty of the two hundred and seventy-five glazed windows.

It was just a century before the family recovered from this blow and were able to again inhabit Compton Wynyates. It was then that Charles, the third marquis, employed Sir Digby Wyatt to rebuild the great staircase, to restore the Tudor windows, and to remove the white Georgian paint from the oak carving, and to secure proper furniture. The present Lord and Lady Northampton, who use it as their summer residence, continue the work of rehabilitation; though they do not aim to completely refurnish the interior, they will leave the exterior of Compton Wynyates what it was in the early Tudor days, the finest piece of brickwork in England.

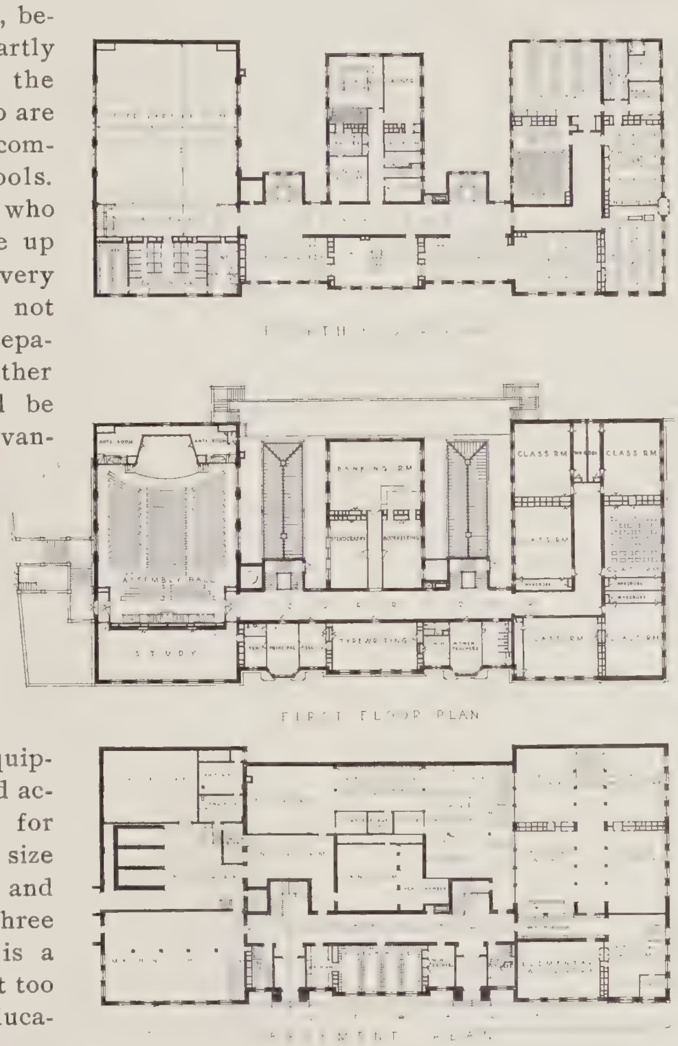
Some Problems in School Planning.

SECOND PAPER — SECONDARY SCHOOLS.

BY R. CLIPSTON STURGIS.

IN THE first article the problem of school planning in large civic centers was briefly outlined and special consideration given to the problems connected with elementary education. In this article it is proposed to consider in the same way the secondary schools.

The problem of the secondary school, as has been said, is far more complicated than that of the elementary. It has the same broad divisions, being partly preparatory and partly a finishing school. Under the former will be all children who are going to college, technical, commercial or professional schools. Under the latter all children who wish to fit themselves to take up work on graduation. The very first question is whether or not there should be divided and separate schools established, or whether all branches of work should be under one roof. There are advantages and disadvantages in either course. The boy preparing for college should have the opportunity for some work in the shops; the boy who is going to work needs the best training in the humanities and sciences, for this is his last chance. Yet the rooms and equipment required for such varied activities are out of proportion for any school except one of a size that exists only in great cities; and when one has a building for three or four thousand students it is a question as to whether it is not too large a unit for good results educationally.



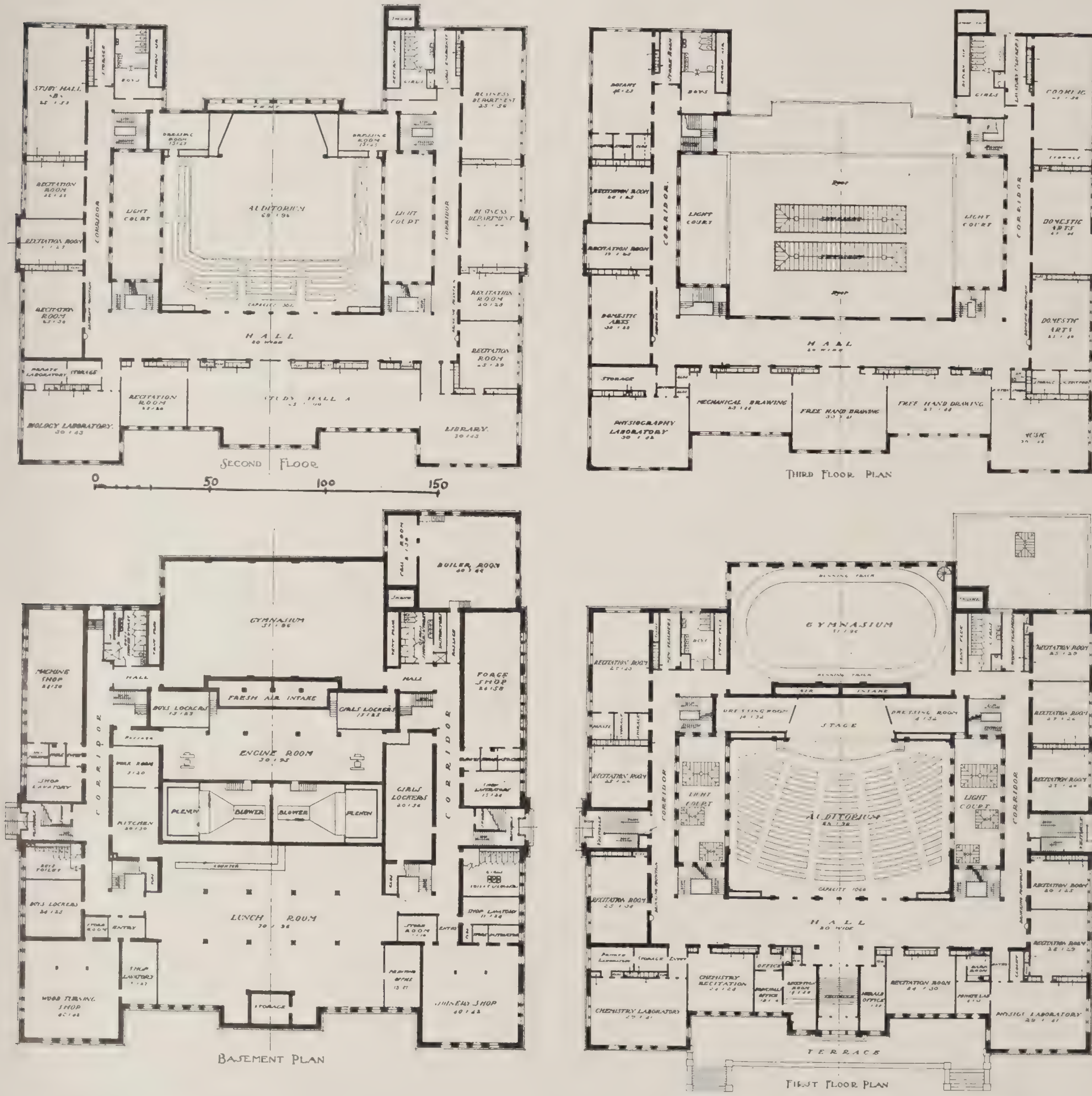
THE CENTRAL SCHOOL, TROY, N. Y.
R. Clipston Sturgis, Architect.
This is a mixed upper elementary and secondary school laid out with the idea of giving the children still in the elementary grades an opportunity to start with definite trade education, to be carried further with the secondary pupils, and further still through evening work with those who are at work in the day time.

Where schools have been separated and differentiated one notices a tendency toward unification of equipment. The technical school finds its academic training deficient, and the classical school demands more scientific and technical work. One is inclined to the view that in most communities the school that is equipped for all branches of study will serve best and prove most economical. It will not however be economical as long as elaborate equipment, suitable for advanced work, is demanded in these preparatory, secondary schools. They are not colleges, they are not professional schools nor are they even trade schools, but are merely preparatory. It would be profitable work to test results and assure ourselves that the outlay for any given course, say chemistry, was justified by the proficiency of the pupils. In the secondary schools the following are demanded and, to a greater or less degree provided in all modern buildings: (1) domestic science for the girls — cooking, housekeeping, sewing, dressmaking, millinery, pattern drawing, and design: (2) handicraft or industrial work for boys — covering various trades in wood and metal, machinery and engines: (3) commercial — covering not only the elementary subjects, bookkeeping, typewriting and stenography, but commercial science and modern languages: (4) drawing — including mechanical, both engineering and architectural, free-hand, life: (5) science — laboratories and lecture rooms for chemistry, physics, botany and zoology: (6) a hall for exercises, singing, etc.: a gymnasium with baths: (7) a lunch room, and, added to these, accommodations for the corps of masters and teachers necessary for all these departments.

To cover all these branches, where in the elementary school the hall, kitchen and shop may represent twenty per cent or twenty-five per cent of the total cubage, in the secondary school one finds that the rooms accessory to the class rooms represent sixty per cent or eighty per cent of the total. It is little wonder if the housing of a secondary pupil should cost $500, where the elementary pupil is housed for $150. One cannot but believe that this enormous increase in expense is unnecessary and unjustifiable. The various divisions outlined above will now be taken up and considered in detail.

Domestic science is generally represented by a suite of rooms like an apartment, and these are sometimes supplemented by rooms for more definite vocational (trade) work, dressmaking and millinery. This means a very large space which even if used by all the girls in the school, as it should be, is so expensive to build and equip as to deserve careful study. If the cooking forms part of the lunch room equipment and marketing is

done for this, and if the class room teaches house-cleaning, it would seem as if all rooms except those for trade work could be dispensed with. These latter are popular, and deservedly, because they not only teach the girls to dress themselves but give most valuable lessons in economy. Although the cost per pupil in a secondary school has occupations of men. The subject has been approached in so many different ways in different communities that one cannot make any statement of what is provided. In one case it is a division of the school, in another it is a whole building. In one, drafting, wood, and sheet metal work will be the limit; in another foundry and forging



WESTPORT HIGH SCHOOL, KANSAS CITY, MO. Charles A. Smith, Architect.

This is a standard type of plan for a large city high school.

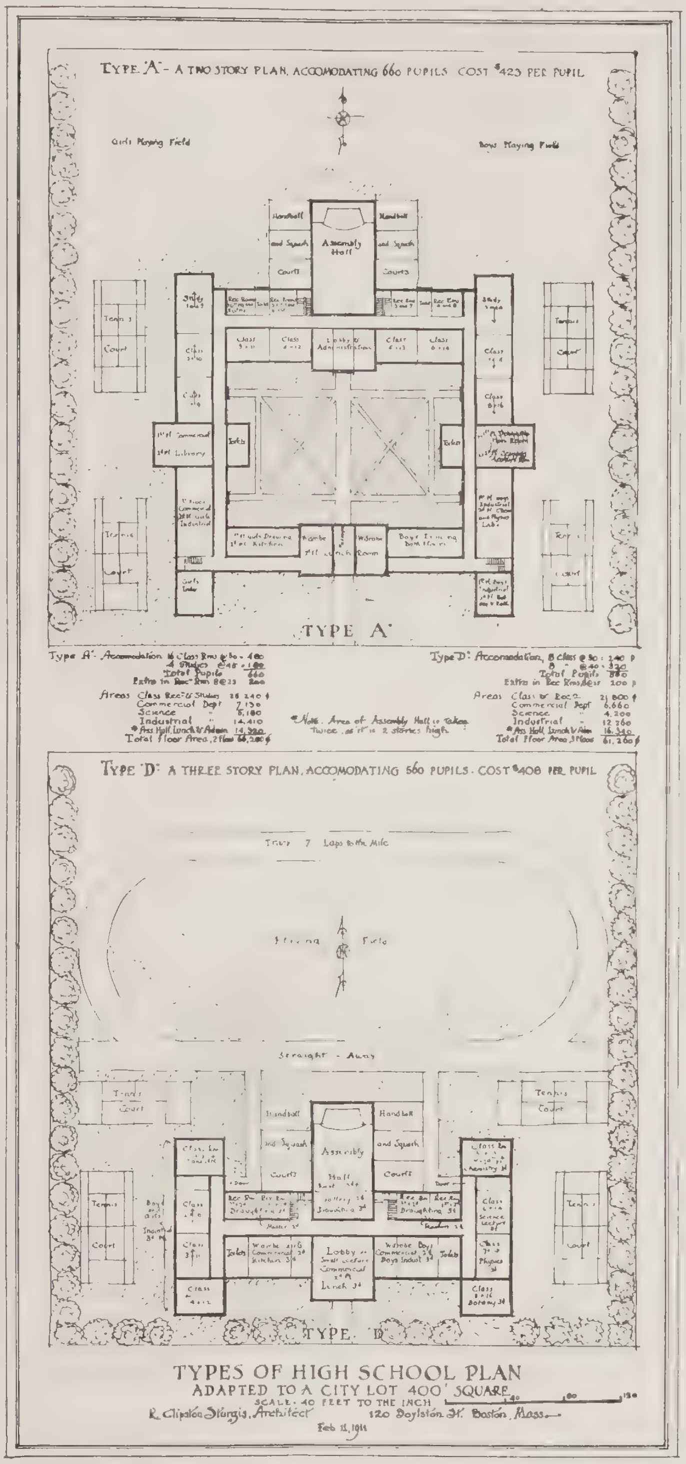
been stated to be $500, the actual class room may still be reckoned, as in the elementary, at about $7,500, and two or at the most three should provide the kitchen for the lunch room, and the dressmaking and millinery rooms, an expenditure of $15,000 to $22,500.

The industrial work for boys is by no means so simple as that for the girls. With the girls, all centers about home-making; with the boys, all is spread over the innumerable machines and engines are provided. The question must inevitably come up as to whether the secondary school shall attempt to teach a trade or not. The answer has generally been given in the negative largely because the boy has not yet time to spare from academic studies to give the necessary undivided attention that learning a trade demands. For the boy who is going on to a technical school where he will have ample opportunity in the

shop it would seem better to devote the years in the secondary school to strictly academic work; but for the boy who is going to work it may be an advantage to have got the elements of his trade, if he knows what it is to be; or at the least some training of eye and hand supplementing what was done in the elementary school. The boys from the manual training room who have had a year or so of practical repair work in the school will be a useful corps of mechanics in the secondary school. A fairly well equipped repair shop would seem to offer a pretty wide range of trade training without occupying very expensive space. A basement shop, or even an outside independent building, would hardly represent more than one or, at most, two class rooms, or $15,000. The more proficient boys in the repair shop might well be utilized to supplement or replace the teachers in the elementary school. There are no better teachers than a capable enthusiastic scholar. As housekeeping is of direct practical value to every girl, whether she become a teacher or a mother, so is the shop work of value to every boy. This point is emphasized because one should spend freely for the divisions which are of general service, and economize on those which are for a special class.

The commercial course comes partly under the latter heading. There is no reason why all should take it; on the other hand it includes both boys and girls and is therefore important. The accommodations provided are generally one or more rooms with desks, a banking room, and a room for typewriting. The rooms with desks represent definite accommodation for pupils. If the sample bank room is omitted, and banking and bookkeeping and stenography taught in the class and recitation rooms, the only room which adds expense would be that for typewriting, a unit of $7,500.

Nearly all secondary schools make a considerable feature of drawing, and emphasis is placed on free-hand, or mechanical more or less according to the tendency of the teacher. One is inclined to think that the best training is that which leads directly to expression in some other division of work. Designing, for the girls to execute in dresses, hats, embroidery, for the boys to execute in wood or metal in the shop, and the careful lettering of all such designs would prove valuable training.



Two types of high school plan on a large suburban lot arranged with a view to give outside playing fields. First, an open court plan and a two story building; second, a compact plan and three story building resulting in more available space for athletics.

Architectural and engineering drafting, and drawing from life belong to advanced professional work and seem out of place in a preparatory school. If drawing were thus limited the drafting rooms would fall naturally into place with the sewing room and the shop, and would represent perhaps two rooms, or $15,000.

The science laboratories come very distinctly in the class of studies that are for the few rather than for the many. The laboratories are singled out because it is here that individual work is done, and done by a small number of pupils. The lecture room with its demonstration table and stereopticon is the generally useful room, and here the instruction is given which has direct bearing on the kitchen and shop. One finds usually in the science department of a modern secondary school two or three rooms devoted to chemistry, a working laboratory for twenty or twenty-four, preparation, storeroom and office; a working laboratory for physics, one for botany and one for zoology, and one and sometimes two lecture rooms to supplement these. It would be well to have figures showing just how much the laboratory tables are used and how much is gained there which the pupil could not gain in the lecture room, for it is in the science laboratories that one of the great features of cost lies. The rooms listed above represent the area of at least six rooms, or $45,000. These rooms add nothing to the accommodation of scholars and are not generally useful. It would seem as if more might be done in the lecture room and that the laboratories might be cut

down to a smaller accommodation in chemistry and physics, and botany and zoology combined, making the space of three instead of six class rooms.

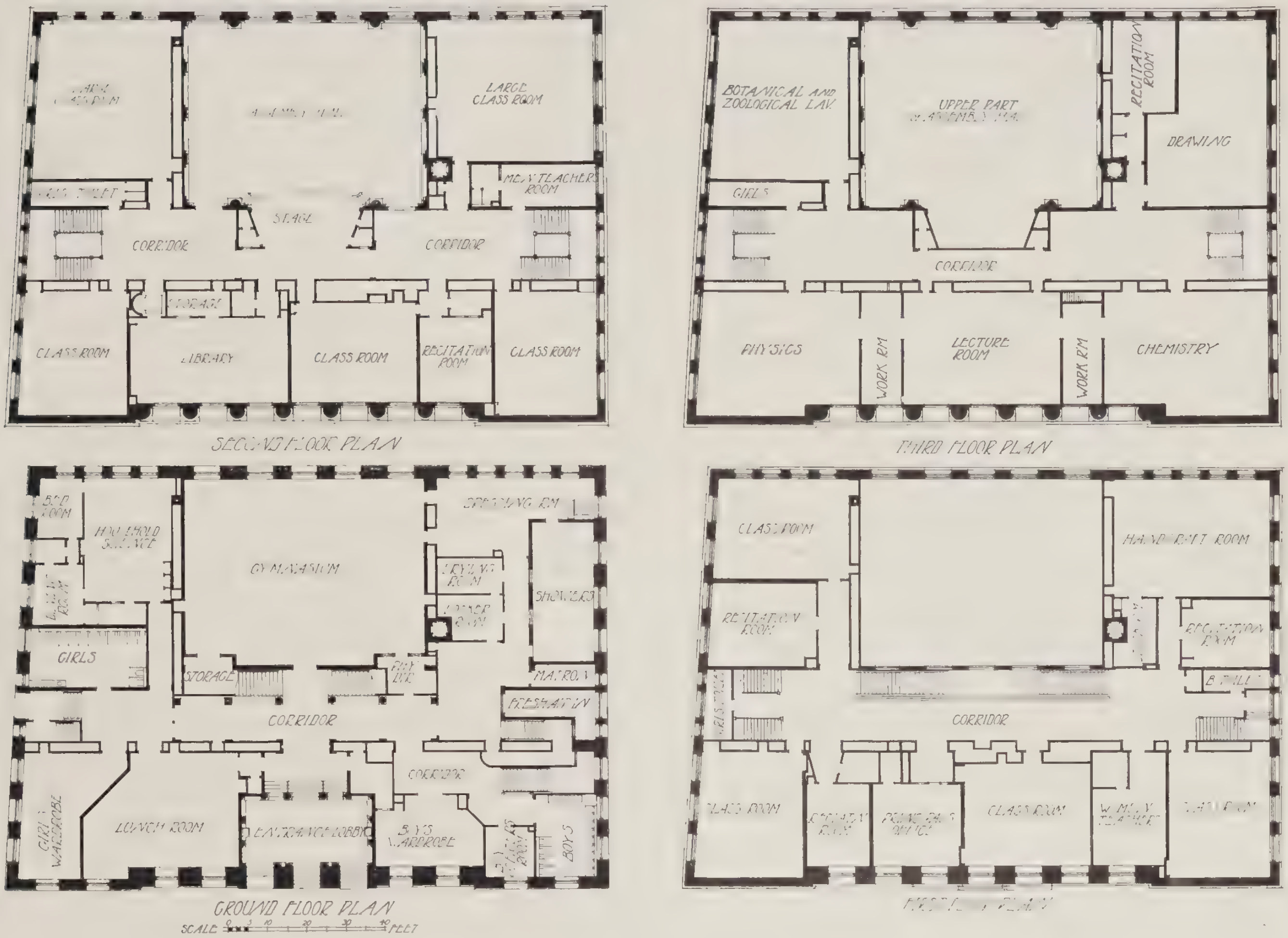
As has been suggested for the elementary schools there seems no reason for taking two large expensive areas where one will serve both purposes. If more use were made of outside recreation grounds, which is the best place for exercise, the use of the hall for a gymnasium would be almost relegated to wet days. Baths are of little use except in connection with well defined periods of exercise where a complete change of clothing is possible. The exercises should be of that description wherever it is possible and under these circumstances baths are most necessary. Even with baths the hall should not represent more than six class rooms, or $45,000.

The only item left to consider is the lunch room. Generally the school lunches all at once and a great space is necessary if even five hundred are to be fed in a very short space of time. An area of three or four class rooms would be the least possible and this is a considerable expenditure. It would seem feasible however to divide the school and so provide for but a portion at a time. With system and discipline and a corps of trained girls to serve, a space of two class rooms would probably answer.

TECHNICAL HIGH SCHOOL, NEWTON, MASS.
A very carefully studied technical school with complete equipment. For plans see Plate 71.

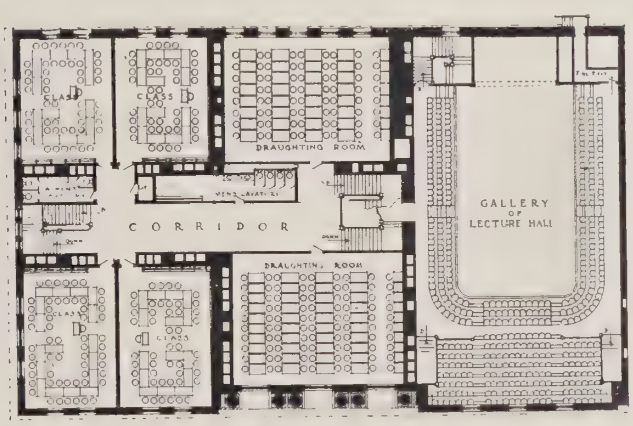
LECTURE HALL, FRANKLIN UNION, BOSTON, MASS.

The system in high schools requires a certain number of recitation rooms and these as a rule are not considered as adding to the seating accommodation of the school. As a matter of fact they frequently do so serve when a school is pressed for room, and without any great inconvenience. If the above allotments of space are applied to a school of twenty class rooms, seating forty each, and if we add ten recitation rooms each half the size of a class room we should get the following: Twenty-five rooms for class and recitations; two for domestic science; two for shops; one for commercial;

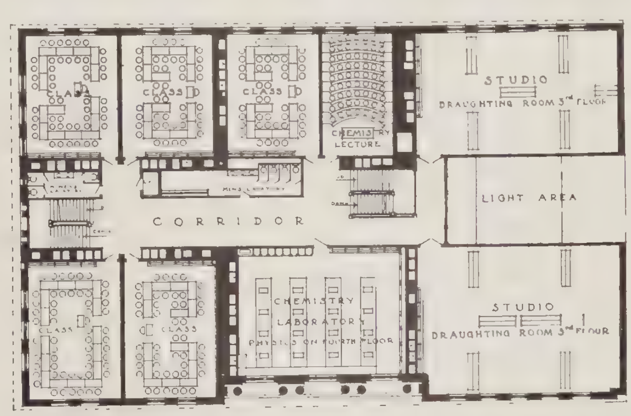


HIGH SCHOOL, CHARLESTOWN, MASS. Stickney & Austin, Architects.

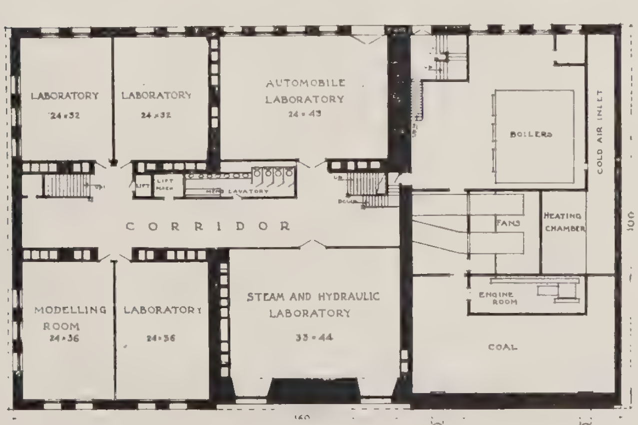
A standard modern high school of a small size having the complete equipment demanded by modern methods, which makes a high cost per pupil necessary.



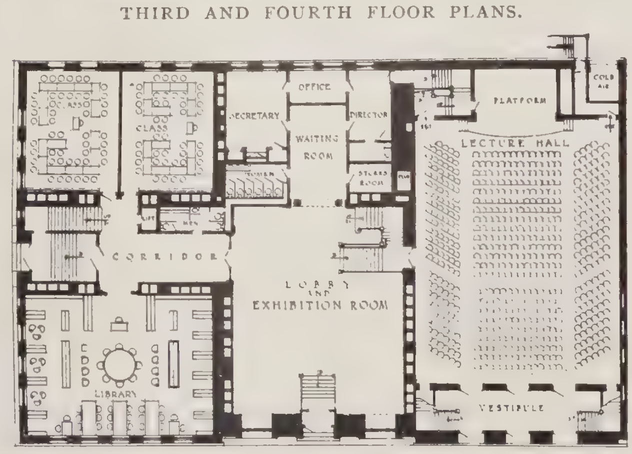
SECOND FLOOR PLAN.



THIRD AND FOURTH FLOOR PLANS.



BASEMENT PLAN.



FIRST FLOOR PLAN.

THE FRANKLIN UNION, BOSTON, MASS. Sturgis & Barton, Architects.

A definite trade school, intended primarily for evening instruction of mechanics already engaged in their trades. School established by the Franklin foundation, the gift of Benjamin Franklin and endowed by Andrew Carnegie.

two for drawing; three for science; six for the hall; two for lunch room; twenty-five for classes and eighteen for other work — forty-three in all — which at $7,500 would be $322,500, or for eight hundred pupils — twenty rooms with forty pupils each — about $400 per pupil.

FOOTNOTE: The elementary class room rated at fifty is the same size as that of the high school which is rated at forty.

With a somewhat larger school no more equipment would be necessary and the showing would be better. Compare this showing with that made in a modern high school. The Charlestown High School, Boston, quoted by so eminent an authority as Dr. Chancellor as an ideal modern high school, has seventy-four per cent of its cube devoted to uses accessory to the class rooms. In the theoretical plan outlined above it would appear that by the simple method of eliminating unnecessary space the seventy-four per cent of the Charlestown High has been reduced to forty per cent and the cost per pupil dropped from $500 to $400.

WINSOR SCHOOL, BROOKLINE, MASS.
R. Clipston Sturgis, Architect.
An upper elementary and high school for girls planned for a suburban site with all the class rooms, recitation rooms and laboratories on first and second floors, the play rooms and studies in the attic.

The Boston elementary schools were brought down to a standard by just this method of testing space; class rooms reduced to the area necessary for thê number of desks, and the height fixed by the requirements of light; rooms for cooking and manual training made of a size to take the number of benches required, and placed, for economy, in well lighted basements; the hall limited in size and simple in character; all other rooms such as drawing, sewing, library, etc., entirely eliminated as unnecessary for elementary work.

The first step in this process of economical planning of elementary schools was taken by the school authorities. The first step in reducing the cost of secondary schools must also come from those who lay out the courses of study; when this is done they can be planned and executed as economically for effective work as are the elementary schools.

This furnishes what is at best but a very rough survey of the problem of housing secondary schools with economy and yet with due regard for the requirements of the present day.

Except for a passing reference to the assembly hall used as a gymnasium hardly any mention has been made of exercise and out of door sports, and yet basket ball and hockey, baseball and football form part of the life of every high school, and gymnasium exercises and track athletics are encouraged. Notwithstanding this, few city high schools provide playing fields for the pupils, but most cities do provide playing fields. A great deal has been said and written about school playgrounds and attempts have been made to determine the number of square feet which should be provided for each pupil. Thirty square feet has been stated as the minimum. The question, the vital question is, what is this area for, does it serve the purpose, is it worth the price paid?

Take an average elementary school in a large city of six hundred pupils. The school should have 18,000 square feet of playground, say 150 by 120. Just what can six hundred children do in that space? Very little except rough-house with each other, — no great harm but not much good. One or two hundred might possibly play some organized game suitable for children on that space, but to have only a portion of the school out at a time means a difficult schedule. The games suitable for little children would not serve the older ones in the secondary schools. All the games played by high school pupils require space, and so much as to be generally prohibitive around the school building. It is then for the school authorities to determine what use is to be made of the playgrounds and then see if that space can be provided without undue cost.

Let us suppose that organized sports are to be conducted on the playgrounds. If the field is to be a class room for exercises out of doors its size like the size of any other class room would be determined by the size of the class. A hundred can exercise on a gymnasium floor of 3,000 square feet. One could afford to give them more space outside. The first question to determine is whether one is trying to provide a playground for six hundred, or an out of doors gymnasium for one hundred. There seems to be nothing in the curriculum of either elementary or secondary schools that would demand a school playing field. There seems to be every reason for providing an exercising ground. If to this could be added space for such out of school hour sports as tennis, hand ball or basket ball, swings, bars, etc., this would be so much clear gain.

In direct connection with the study of the grounds would come the study of locker rooms, wash rooms, wardrobes. Thus far however only school accommodation has been considered, — that is class rooms and the rooms connected directly with instruction. Lockers, toilets, etc., are the accessories of administration and these will be considered in the next article with the other matters that belong primarily in the province of the architect. Here also will be considered the plan of the building to provide economically for circulation and administration, and the question of wardrobe and lockers, especially in the secondary schools.

The Heating and Ventilation of Theaters.

BY CHARLES L. HUBBARD.

THE conditions to be met in the heating and ventilation of theaters differ from those in the auditoriums previously described chiefly in the greater number of occupants per cubic foot of space, and also the longer periods during which they are continuously occupied. In the case of church auditoriums the audience is seldom assembled for more than an hour at a time, the cubic contents is large compared with the number of occupants, so that by starting with a room full of fresh air the conditions will not be seriously affected by temporary lapses in the action of the ventilating system. This makes it possible to use systems like furnaces and indirect steam, which, while giving good results under ordinary conditions, are liable to be affected to a greater or lesser degree by changes in wind and outside temperature. In case of a theater the conditions are changed; not only is the floor closely packed but there are usually two or three deep balconies, which not only add to the number of occupants, but also by their construction, form pockets where the air is likely to become stagnant and overheated. It is evident that an auditorium of this kind cannot depend upon gravity systems of heating where the efficiency varies with the weather. A theater auditorium is usually surrounded with other buildings or rooms so that it has but little, if any, outside exposure; and again, the animal heat given off by a closely packed audience is sufficient to raise the temperature from 5 to 10°. This often makes the problem one of cooling rather than of heating, and it would be impossible to get anything like the required amount of air into the room by gravity flow under these conditions. It is therefore evident that the only system of ventilation adapted to theaters is one employing fans, both for supply and discharge. As the volume of air supplied must be large, compared with the cubic contents of the room, care must be taken to introduce it in such a manner as to avoid drafts. This is especially important, because, as already stated, much of the time the air must be delivered at a temperature below that of the room, and if introduced in any considerable quantity through openings above the heads of the people, unpleasant results will be sure to follow. The most satisfactory way of supplying air to a theater, and the one most generally followed at the present time, is to provide plenum spaces beneath the floors, both of the main auditorium and the balconies, and to pass the air from here into the room through a large number of small openings. This system of distribution may be supplemented by flues and registers in the side walls at such points as may seem necessary, and by special flues to boxes, foyers, etc. The discharge ventilation should be through openings either in or near the ceiling. A portion of the air should be removed from a point near the center of the main ceiling, and the remainder at the rear of the balconies. It is very important that this ventilation be particularly strong, as the first complaints of bad air and overheating usually come from these quarters.

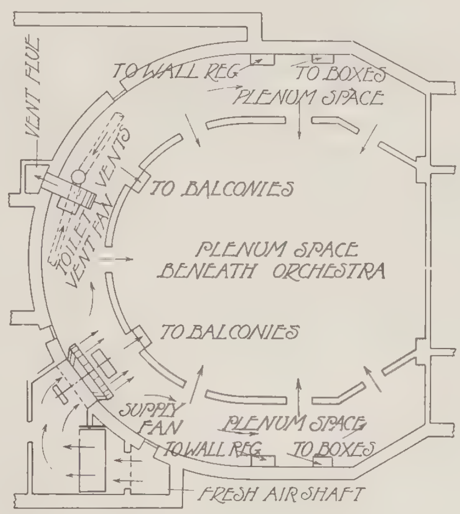


FIG. I.

It is generally advisable to maintain a slight pressure in the auditorium, so that the air leakage will be outward into the corridors and foyers, rather than inward, both on account of cool drafts and possible admission of odors from smoking and toilet rooms. On the other hand, if the pressure is too great, it will cause a bulging of the curtain outward toward the stage. In practice a very careful adjustment of the supply and vent fans is necessary to produce the required pressure for the best results. Foyers, public dressing rooms, smoking rooms, and toilets, should be thoroughly ventilated; the first two having both supply and discharge ventilation, while smoking room and toilets should always be maintained under a slight suction to prevent the outward leakage of any air which may carry odors to other parts of the building. Private dressing rooms, rehearsal rooms, etc., should, if possible, be provided with some form of ventilation, although this is not always done. Having outlined the general methods to be followed, the different parts will now be taken up in some detail.

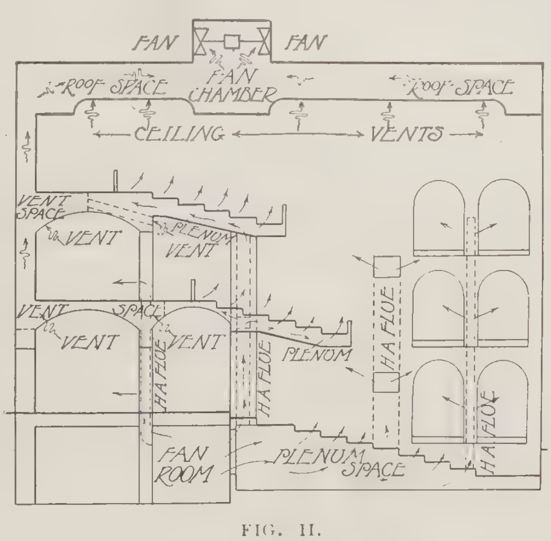


FIG. II.

The air supply to a theater should be generous, and the apparatus should be designed to furnish at least 30 cubic feet per minute per occupant. The different parts of the system may usually be proportioned on the "unit" system, taking one hundred occupants as a basis, the same as in church heating. This applies especially to cases where the auditorium has no outside wall exposure. Under other conditions the methods given for halls, in a previous article, may be used. In the case of an enclosed auditorium, if the main heater is made of sufficient size to raise the temperature of the

maximum air supply from 0 to 80° it will usually answer all purposes for both heating and ventilation. Assuming an air supply of 30 cubic feet per minute per occupant, this will call for about 200 square feet of heating surface in the main coil for each one hundred occupants. It is generally usual, in the best practice, to furnish a certain amount of fresh air to the foyers. This, under average conditions, may be taken as three to four complete changes per hour. This amount may be taken from the main supply and the fan and heater proportioned accordingly. The size and speed of fan and power of motor may be taken the same as for church heating where a given volume of air is to be moved. The power of the boilers may be based on one horse-power for each 25 square feet of heating surface at the fan, or its equivalent, eight horse-power for each one hundred occupants. To this must be added the necessary capacity for supplying the direct radiation, based on one horse-power for each 130 square feet. The basement arrangement for a typical layout is shown in Fig. I. In this case the fresh air is brought from the roof level through a brick shaft, then passed through a heater and delivered into a plenum space beneath the main floor by means of a fan. The air passes from the annular space into the circular chamber beneath the orchestra through a series of openings and from here upward through the floor in a manner to be described later.

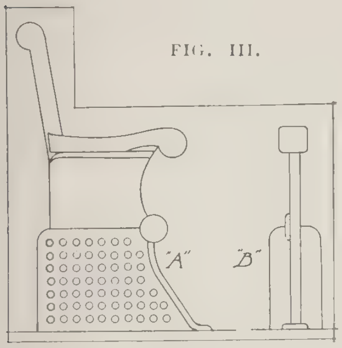


FIG. III.

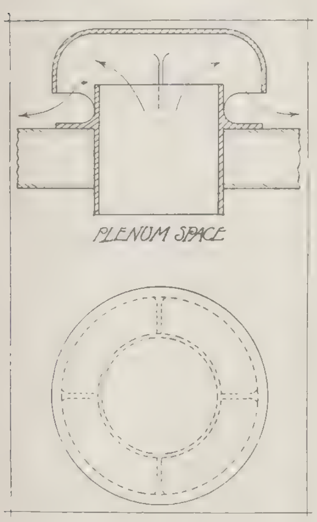


FIG. IV.

Uptake flues leading to the boxes and to the side-wall registers are indicated on the plan. The supply to the balconies is through two flues near the center, which are carried up inside of large columns to connect with plenum spaces shown on another plan. The vent or exhaust fan shown, is for the purpose of providing a strong discharge ventilation from the toilets and smoking room, the flues from these rooms being brought downward to the basement, as shown. This fan discharges into a brick or galvanized iron uptake leading to the top of the building; care being taken to locate it so the foul air cannot be drawn into the supply intake. A longitudinal section through the auditorium and foyers is shown in section in Fig. II.

This illustrates the method of air supply and exhaust, the former being indicated by straight arrows and the latter by spiral arrows. The plenum space beneath the floor of the orchestra connects directly with the fan room as shown. One of the large columns carrying a flue to the first and second balconies is seen at the center. There should be two or three openings from this into the plenum space of the first balcony, in order to secure a good distribution. It is also a good plan to provide a deflector at the top of this flue, in the second balcony space, for the same purpose. The flow of air to the two balconies should be equalized by the use of adjusting dampers at the outlets.

Sometimes the building construction is such that these uptake flues are best carried up in the side walls, from which they are connected with the balcony plenum spaces as before. There should be at least two of these uptakes, and in theaters of large size four will give a better distribution. Air to the foyers is carried up through flues in the hollow partition at the back of the auditorium, as shown. These connect with the fan room in the basement and are provided with regulating dampers the same as the main balcony flues. The side-wall registers are not always employed, but may be used if the building arrangement is such as to form a pocket at this point which will not be easily reached by air currents from the floor. Again, if there is a strong exhaust beneath the balconies, the air from these registers will be drawn in that direction and so aid in the general air supply. In the arrangement shown, each box is provided with a separate supply register. Another method sometimes used is to deliver the air into the narrow corridors at the rear of the boxes and allow it to enter through special grilles or spaces beneath the doors provided for that particular purpose. There are two common methods of admitting the air from the plenum chambers into the room. One of these, the older method, is shown in Fig. III. This consists of a special design of chair leg, which forms an air chamber connected with the plenum space below by means of suitable openings in the floor.

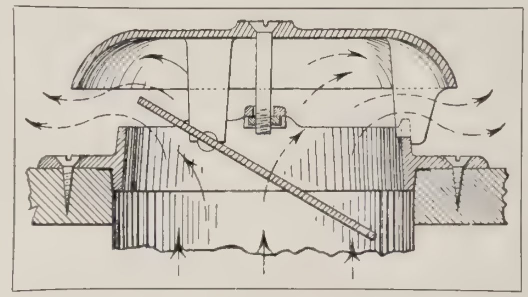


FIG. V.

FIG. VI.

A side view of one of these ventilating chair legs is shown at "A," and a front view at "B." The air is admitted to the room through a large number of small perforations in both sides of the leg. Although the air passes through the floor opening into the chair leg at a comparatively high velocity, this is so reduced by the large number of perforations, that it issues into the room without

perceptible drafts. These chairs are so constructed that each leg is common to two chairs, that is, there is one ventilating chamber to each occupant. If an air supply of 30 cubic feet per minute per occupant is to be provided, and a velocity of 600 feet per minute is allowed through the floor openings, the area under each leg should be about 7 square inches. With wooden floors it is customary to bore two 2¼ inch holes under each leg, which gives practically the required area. In the latest work, the "mushroom" ventilator, so called, has been quite extensively used, and its general form is shown in plan and section in Fig. IV. It is commonly made of cast-iron, and one is placed in the floor beneath each seat. Air from the plenum space passes upward through the central tube and striking the hood, its velocity is checked, and it flows outward into the room as indicated by the arrows without producing appreciable drafts.

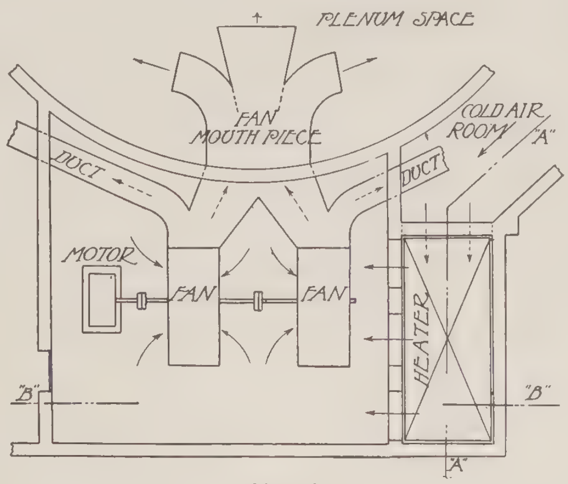


FIG. VII.

When the air is delivered into a plenum space at a high velocity from one or more supply ducts or flues, the pressure is apt to vary in different parts of the chamber, and to result in an uneven flow through the different chair or mushroom openings. This makes it desirable to provide each outlet with an adjustable damper for equalizing the flow. Such a damper is shown in Fig. V. The position and appearance of the mushrooms beneath the chairs are shown in Fig. VI.

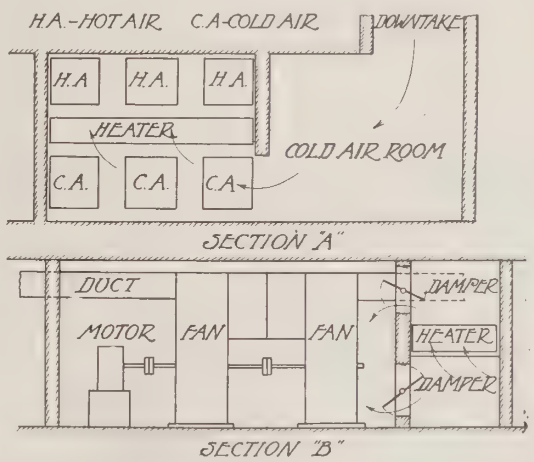


FIG. VIII.

A typical arrangement for the supply fan and heater in a theater is shown in Fig. VII. In this case two fans of smaller diameter are used on account of limited head room. Even when there is sufficient space it is not customary to use fans above 9 or 10 feet in diameter for this class of work. In the layout shown, two fans are used, coupled together as indicated, and driven by a direct-connected electric motor. The larger part of the air is discharged directly into a main plenum space which supplies the chairs on the first floor and also connects with the flues leading to the balconies. Air distribution within the plenum space is secured by means of a special form of mouthpiece having three outlets as shown. The distributing effect of this may be still further increased by flaring each outlet and providing it with a number of diffusing blades or deflectors. The side ducts supply air to the foyers and certain other rooms which are not easily reached from the main plenum space.

The arrangement of the fresh air supply and the heater is best shown in sections "A" and "B" in Fig. VIII. The fresh air is brought from the top of the building through a brick shaft which connects with the cold air room at the bottom. From here it flows into the heating chamber beneath the heater, part of it passing to the fan room by way of the heater and the upper or hot air openings, and part through the cold air openings, depending upon the position of the mixing dampers. The method of regulating the temperature of the air is best illustrated in section "B." The dampers are arranged in pairs as shown, one being above the heater and admitting hot air to the fan room, and the other below and admitting cold air. These are so connected by means of levers that as one opens the other closes a like amount, thus varying the proportions of hot and cold air admitted to the fans. A common arrangement for the discharge ventilation is shown by the spiral arrows in Fig. II. This is in part through ceiling vents into the roof space and partly through vents near the ceiling at the rear of the spaces beneath the balconies. These latter registers usually open into spaces shut off from the plenum or fresh air spaces as shown, and are connected with the main roof space by means of uptake flues concealed in the wall or in pilasters constructed especially for this purpose. From the roof space the air is discharged outboard by means of exhaust fans, usually of the disk or propeller type. The principal objection against allowing the air to pass from the room directly into the roof space is that the full suction force of the exhaust fan is not realized because of the inleakage of outside air through the roof. In addition to this, when the fans are not running, the air in this space is likely to be cooled by contact with the cold roof and tends to fall through the ceiling vents into the room below. Both of these objectionable features can be avoided, to a large extent, by connecting the various vent registers with the fan by means of iron ducts, as shown in diagram in Fig. IX. This arrangement produces a stronger

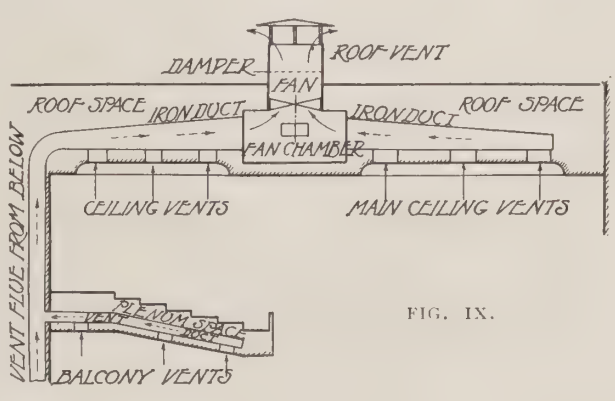


FIG. IX.

suction at the registers, for a given size and speed of fan, and lessens the falling of cold air into the room below. The latter, however, may be still further reduced by covering the ducts with some cheap form of insulation.

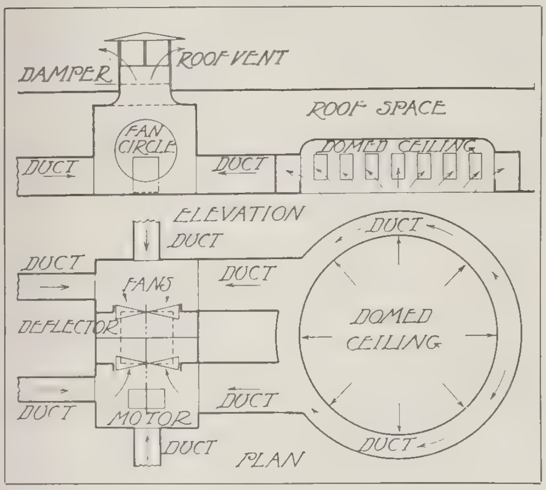


FIG. X.

Another arrangement of ceiling vent and exhaust fans is shown in plan and elevation in Fig. X. In this case a circular or oval dome is constructed in the ceiling, with openings in the side as indicated in the section. This is surrounded by a circular duct connected with a double fan chamber, shown more clearly in the plan. The two exhaust fans discharge toward each other, but are separated by a curved deflector which throws the air upward into the roof vent. Ducts from balconies and other portions of the building are brought into the fan chambers as shown on the plan. Thus far only the main auditorium has been considered, except for a brief mention of the foyer ventilation. The heating of foyers, corridors, toilet and smoking rooms, dressing rooms, etc., is best done by some form of direct radiation, entirely independent of the ventilating system. In the foyers, where exposed radiators would be objectionable, it is usually possible to conceal them by ornamental screens, care being taken to provide sufficient opening for a good circulation of air over the radiators. A strong discharge ventilation should be provided for smoking room and toilets by means of direct connection with a special exhaust fan. The entire contents of these rooms should be changed every three to five minutes to prevent any possibility of odors escaping into other parts of the building. If possible, some form of ventilation should be furnished for the small dressing rooms. If an abundance of fresh air is delivered into the corridors with which they connect, and grilles or louvers provided in the lower part of the doors, very good results will be obtained by using a small vent register connecting with the general ventilation from the building.

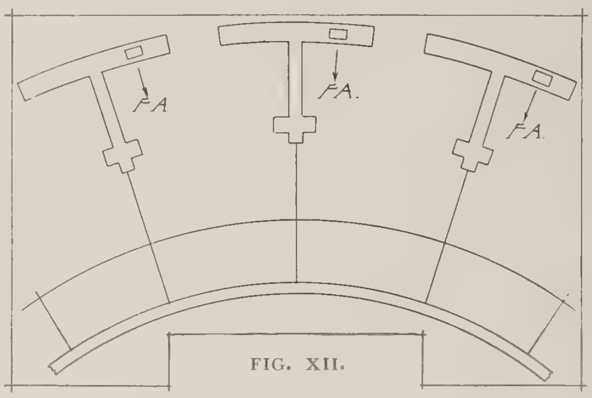


FIG. XII.

Fig XI shows an interior view of a portion of the Boston Opera House, which contains some of the most advanced ideas in the heating and ventilation of this type of building. The ventilating system of this building has a capacity of about 80,000 cubic feet of air per minute, which is supplied by two 8 foot centrifugal fans. The main exhaust fans, two in number, are of the propeller type, 7 feet in diameter. A special fan, 30 inches in diameter, is provided for toilet and smoking rooms. The building is heated by approximately 8,400 square feet of direct radiation, and the main heater at the fans contains 3,330 square feet of surface.

FIG. XI.

The air supply to the main floor and balconies is accomplished by the use of plenum spaces beneath the floors, with mushroom openings under the chairs. A special feature of this auditorium is a separate air supply to each private box, as illustrated in diagram in Fig. XII. The general arrangement of the main supply fans and heater in the basement is similar to that shown in Fig. VII. Discharge ventilation is through ceiling vents, partly in the main ceiling and partly in the spaces under the balconies. The exhaust fans are located in the roof space, the general scheme employed being similar to Fig. X.

Plate Illustrations—Description.

Technical High School, Newton, Mass. Plate 71. The building is of light gray brick with limestone trimmings. The pupil's entrance is in the center of the two wings, while the public entrance is through the front court which is raised 6 steps above the general grade, forming a terrace with wide central steps and balustrade connecting the two wings of the front. This court is 88 feet in width while the total frontage of the school is 233 feet. An independent entrance gives access to the various offices. The ten class rooms on the first floor seat 48 pupils each. The lunch rooms, with kitchen, for the boys and girls are located on the sunny side of the building. The central lecture hall on the third floor seats 416. The walls and ceilings have a gray tint, except in the library where a green tone has been used. The woodwork is of brown ash and the floors of maple, with the exception of the halls and toilets which have terrazzo flooring. The total cost of the building exclusive of the furnishings and architect's fee was $345,506. This gives approximately 17.9 cents per cubic foot, there being 1,929,159 cubic feet in the building.

Gymnasium at Syracuse University, Syracuse, N. Y. Plates 74-76. The exterior of the building is of pressed iron spot bricks with cream terra cotta trimmings and granite base. In the basement is provided a swimming pool 29 by 90 feet, graduated in depth from 4 feet 6 inches to 7 feet, with a specially designed curb and scum trough which also serves as a life rail. Directly opposite and of corresponding size is the rowing room which contains the rowing tank and space for necessary apparatus. The team rooms are fully equipped with toilets, showers, steel lockers, rubbing rooms, etc., and adjoin the stairway which gives access to the subway that leads to the stadium arena. The main stairs ascend to the trophy and social hall on the main floor. The large locker room, which occupies the entire rear of this floor, has outside light on three sides. The gymnasium room proper is reached by iron and marble stairs from the social hall as well as the locker room direct. The gymnasium room, 100 by 210 feet, has three great steel hinged trusses supporting the glass dome. The running track, eleven laps to the mile, is 10 feet wide on the straightaway and 12 feet on the turns, and is banked and coved with ½ inch of cork carpet. The dome over the gymnasium is of steel, copper, and glass. The floors of entrance vestibule, entrance hall, racing room, swimming room, pool shower room, drying room, and all toilets are covered with tile. Subways and conduits for the plumbing, heating, and lighting systems extend under the entire building with free access. The water of the swimming pool is heated by circulation to and from the central heating and power plant. The water of the rowing tank is so moved by mechanical means that the rowing conditions approximate very closely the actual conditions. The building, which is absolutely fireproof, is heated and lighted from the central plant. The over all dimensions are 149 by 222 feet 8 inches. The total cost exclusive of equipment was $349,825, and the cost per cubic foot 18¾ cents. The cost of apparatus and equipment, which includes 1,650 specially designed steel lockers, was $18,600.

Christ Congregational Church, New York City. Plate 77. The problem of this building was to design on an irregular plot facing two streets a church containing an auditorium, gymnasium, meeting rooms, and parsonage. No projections were permitted beyond the lot line on the main thoroughfare. The exterior walls are built of red brick with raked joints; the keys, window sills, water table, etc., of limestone; the main steps of bluestone, and the portico, cornices, windows, and spires of wood, painted white. The roofs are of tin, painted green. Upon the interior the walls of the auditorium are of white plaster. The woodwork, such as wainscots, doors, pulpit, etc., is painted white. The pews are of birch, stained to imitate mahogany. The seating capacity of the main auditorium including the balcony is 370, which will be increased to 527 when the contemplated galleries at each side have been built. Steam heating is used except in the parsonage where the hot air furnace has been installed. The lighting throughout is by electricity. The total cubical contents of the main building and the two wings are 271,744 cubic feet. The cost of the building was about $50,000 or approximately 18½ cents per cubic foot. The measurements in cubing the main auditorium building were taken from basement floor to the level line at finished ceiling of upper part of dome. The measurements in cubing the parsonage and gymnasium wings were taken from the basement floor to level line about 2 feet 6 inches above the ceiling of these wings. The total cubage of the attic room in parsonage wing and of the entire spire was included.

Town Hall, Westwood, Mass. Plate 83. The exterior of this building is treated in red brick with trimmings of stone. Upon the interior the floors are of maple. The woodwork in the town offices is quartered oak, in the auditorium and other rooms North Carolina pine. The cost of the building exclusive of furnishings and architects' fee was $25,500. The cubage, taken from the bottom of the foundation to one-half the pitch of the roof, is 142,674 cubic feet, making a cost of approximately 18 cents per cubic foot.

Town Hall and Offices, New Canaan, Conn. Plate 84. The exterior of this building is faced in dark red Harvard brick with trimmings of stone. The broad entrance steps are of bluestone leading to a terrace paved with brick. The auditorium occupies the entire rear portion of the building above the basement, measuring 44 feet by 57 feet. A stairway connects the court room with the lock-up in the basement. The lock-up, which is equipped with four steel cells, is entered from the outside by an area doorway at the foot of an inclined walk. In the front portion of the basement a polling station has been provided for all elections. The remainder of the basement is occupied by a boiler room, a fireproof storage vault, a storeroom, a general toilet room, stage dressing rooms, and a future police room. The building is heated by steam and lighted by electricity. The interior woodwork is of oak. The total cost including lighting fixtures was $38,074. The cubage is 195,000 feet, making the cost per cubic foot approximately 19½ cents.

Editorial Comment and Miscellany.

DETAIL FOR THEATER.
Made by Conkling-Armstrong Terra Cotta Company.
Harry E. Westover, Architect.

CITY PLANNING CONFERENCE.

THE third annual meeting of the City Planning Conference was held in Philadelphia, May 15, 16, and 17. Over two hundred and fifty representatives were present from all the cities of importance in the United States as well as from many of the foreign countries.

The first session was spent in the reading of a paper on German Municipal Real Estate Policies by Frederick C. Howe, together with its discussion. Mr. Howe showed how the German cities were able to acquire large areas and protect themselves by adopting the policy of "Excess Condemnation." By this plan the extra land is sold with considerable profit after the improvements have been made. Other papers were read during the conference by Ernest Hogg on The Proper Distribution of Public Buildings; by F. M. Day on Parks as Building Sites; by Lawrence Veiller on the National Housing Problem; by Lawson Purdy on Taxes, Assessment, and Condemnation; by Calvin Tomkins on the Dock Problem; by C. M. Robinson and John Nolen on Street Widths and their Subdivision; and by A. W. Crawford on the Principles of a Uniform City Planning Code.

Mr. Day in his address on Parks as Building Sites said that those who advocate the erection of a building upon any open space within the city should prove: *First*—That the service to the public of the proposed building will be greater than the service of the open ground plus the use to which that ground may be put without building on it. *Second*—That the increased public service due to the erection of the building shall be an affair not only of the immediate future but of the distant future, for it is quite conceivable that the utility of the ground as mere open space may advance much more rapidly than the utility of the intended building. *Third*—That it is impossible to obtain any other site suitable for the proposed building.

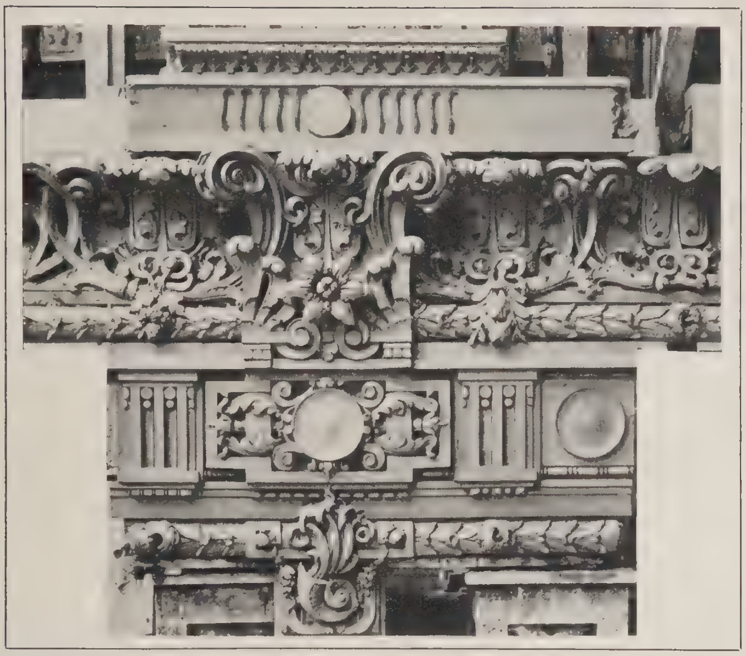
DETAIL BY SHIRE & KAUFMAN, ARCHITECTS.
Executed by South Amboy Terra Cotta Company.

DETAIL BY V. J. KLUTHO, ARCHITECT.
Executed by Winkle Terra Cotta Company.

Mr. Veiller in his discussion stated that the city planning would be the means of solving the housing problem. He urged the abandonment of back yards and alleys, and recommended in their stead large open spaces for light and ventilation. He advanced the point that no buildings in the city should exceed 60 feet in height.

The banquet which closed the conference was held at the Bellevue Stratford. Toasts were given by Mayor Reyburn, Count J. H. von Bernstoff, and Senator F. G. Newlands. Mr. Newlands talked on the benefits that would accrue from the establishment of a new

DETAIL FOR HEARST BUILDING.
Executed in polychrome enamel terra cotta by Northwestern Terra Cotta Company.
James C. Green, Architect.



DETAIL, STATE EDUCATIONAL BUILDING, ALBANY, N. Y.
Executed by the Atlantic Terra Cotta Company.
Palmer & Hornbostel, Architects.

Department of Art and City Planning by the Federal government.

WOOLWORTH BUILDING.

THE tallest skyscraper in the world will be the Woolworth building now being erected on the west side of Broadway between Park place and Barclay street, New York City. It will rise to a height of 750 feet above the sidewalk, exceeding all other structures excepting Eiffel Tower. The main building will be 31 stories high, while the tower, which is 86 by 84 feet, will have 24 additional stories. There will be installed in the very top of the tower a powerful electric light which will be visible 100 miles out to sea. The exterior of the building will be treated in terra cotta and stone. The total contents of the building, measured from the top of the caissons, will be 13,200,000 cubic feet. The caissons will extend down to rock bottom some 130 feet below the level of the sidewalk. There will be 34 elevators installed in addition to outside fireproof stairways in the court, which will be entirely separated by fireproof walls. The cost, including the site, will be approximately $9,000,000, one-ninth of which will be used in the excavation. The architect of the building is Cass Gilbert.

DETAIL, STATE EDUCATIONAL BUILDING, ALBANY, N. Y.
Executed by the Atlantic Terra Cotta Company.
Palmer & Hornbostel, Architects.

COMPETITION FOR PLANS FOR A VOCATIONAL HIGH SCHOOL IN THE CITY OF SYRACUSE, N. Y.

APPLICATIONS for the program will be received up to July 15, 1911, by E. E. MacCready, Department of Public Instruction, Syracuse, N. Y., from architects practising and who have maintained offices in the States of New York, New Jersey, Pennsylvania, Massachusetts and Ohio, prior to 1911.

Plans are to be received up to Sept. 1, 1911.

A professional adviser of recognized ability will be employed to assist in making the award.

Four prizes are offered as follows: For the best design $750; second best, $500; third best, $350; fourth best, $250.

In case of abandonment of the project for erecting the building contemplated herein, the above awards to constitute payment in full of all claims against the city by reason of this competition. If, however, it is subsequently decided to proceed with the building of a Vocational High School, the city of Syracuse agrees not to make use of any design or portion thereof without arrangement for additional compensation, or else to institute a further competition between the four successful plans of this competition.

NATIONAL THEATER, MEXICO.

THE new National Theater of Mexico, constructed entirely of white marble, will cost approximately $8,000,000. The design calls for a seating capacity of 3,000. The special feature of this building will be the glass drop curtain, which contains more than 2,500 square feet of glass mosaic and weighs 27 tons. It is divided into 200 panels, 3 feet square. The whole curtain consists of 1,000,000 separate pieces of Favrille glass set in a composition impervious alike to heat and moisture. The glass itself is 1/16 of an inch in thickness with a backing of 10 inches. The curtain, which will be raised and lowered by hydraulic pressure, shows a view of the mountains in

DETAIL, STATE EDUCATIONAL BUILDING, ALBANY, N. Y.
Executed by the Atlantic Terra Cotta Company.
Palmer & Hornbostel, Architects.

Mexico and lends a decorative character in harmony with the design of the other interior finishings.

and painting. It will face the National Museum of Antiquities on the Patisia Road and will preserve to posterity the works of art which have been scattered throughout the country as well as injured by not being properly housed.

BLOCK OF NEW HOUSES, BAY STATE ROAD, BOSTON.
Fronts of "Tapestry" brick, manufactured by Fiske & Co., Inc.
E. B. Stratton, Architect.

MADISON SQUARE GARDEN SOLD.

AT LAST this famous structure has been turned over to a syndicate for $3,500,000. Repeated efforts have been made to sell the Garden, which, from a financial standpoint, has proven a failure from its opening. It is considered by many critics as the masterpiece of the late Stanford White. It will soon be demolished and in its place will be erected a twenty-five-story office building, which will represent an investment of $12,000,000. The architects for the new structure are Warren & Wetmore.

A BUILDING is being erected in Athens which will become the Greek National Gallery for the preservation of their works in sculpture and painting.

POLICE HEADQUARTERS BUILDING, NEW YORK CITY.
Terra cotta furnished by the New York Architectural Terra Cotta Company.
Hoppin, Koen & Huntingdon, Architects.

IN GENERAL.

The Spokane Architectural Club, which has been in existence since 1899, has filed articles of incorporation and elected the following as officers for the ensuing year: President, Julius A. Zittel; vice-president, C. Hubbell; secretary, H. C. Whitehouse; treasurer, F. P. Rooney. The club has established a bureau of employment for draftsmen and will give a series of lectures primarily for the education of the public.

At the annual meeting of the Southern Pennsylvania Chapter A. I. A. held at York, Pa., in May, the

following officers were elected: President, J. A. Dempwolf; vice-president, M. I. Kast; secretary, B. F. Willis; treasurer, C. E. Urban.

Hugh Tallant, formerly a member of the firm of Herts & Tallant, architects, has been admitted to the firm of Lord & Hewlett, New York, the new name of the firm being Lord, Hewlett & Tallant.

J. E. Heimerl has been admitted to the firm of Brust & Philipp. The new name of the firm is Brust, Philipp & Heimerl; offices, Milwaukee, Wis.

Alfred L. Darrow, architect, has removed his offices to 8 Beacon street, Boston.

The two hundred or more new houses which have been built at Long Beach, L. I. — about an hour out of New York — offer a splendid display of the various types of roofing tile which are manufactured by the Ludowici-Celadon Company. Every building in the place has a tile roof.

HOUSE AT CHICAGO.
Roofed with Ludowici-Celadon tile.
W. C. Zimmerman, Architect.

COW BARN, STATE HOSPITAL FOR INSANE, NORRISTOWN, PA.
The exterior walls are constructed of 10 inch "Natco" hollow tiles, making a damp-proof, cool-in-summer, warm-in-winter, wall.
Baker & Dallett, Architects.

Edward Shepard Hewitt and William Lawrence Bottomley have formed a copartnership for the practice of architecture under the firm name of Hewitt & Bottomley; offices, 527 Fifth avenue, New York.

Tobias Bearwald and Albert J. Fabre have formed a copartnership for the practice of architecture under the firm name of Fabre & Bearwald; offices, Western Metropolis Bank building, San Francisco.

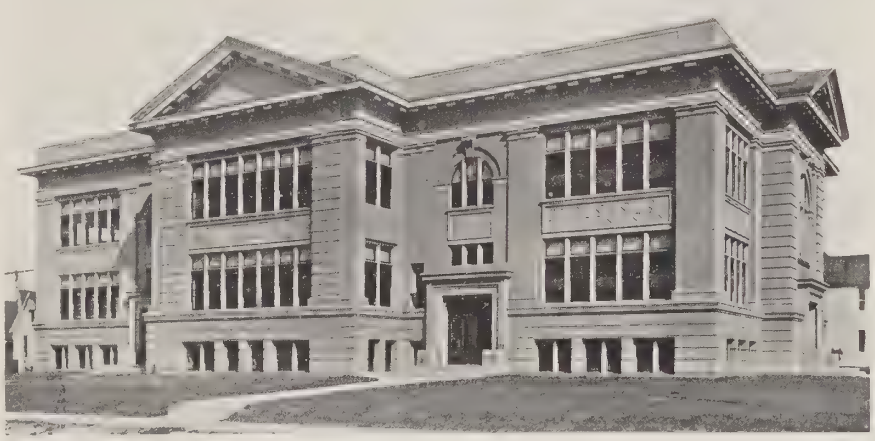
The Ohio Mining and Manufacturing Company supplied the bricks which were used in the new gymnasium building for the University of Syracuse, illustrated in the plate forms of this issue.

The Atlanta Terra Cotta Company supplied the architectural terra cotta for the Presbyterian Church at Chattanooga, which is illustrated in the plate forms of this issue.

The Atlantic Terra Cotta Company supplied the architectural terra cotta for the new gymnasium at Syracuse University, which is illustrated in the plate forms of this issue.

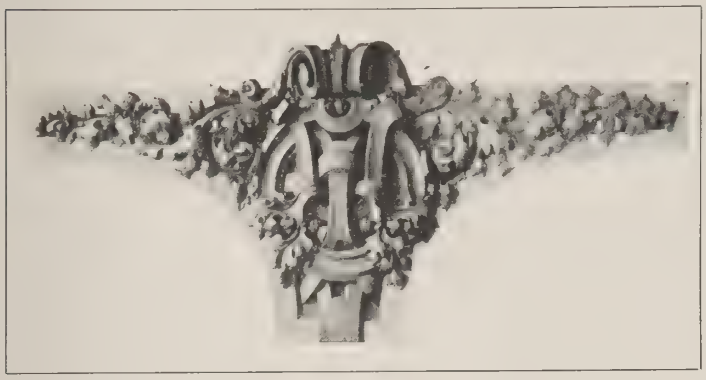
Harvard Brick, supplied by Carter, Black & Ayers, will be used in the new Ladd residence at Far Hills, New Jersey, Guy Lowell, architect. Also for the Cravath residence at Locust Valley, L. I., Guy Lowell, architect.

The South Amboy Terra Cotta Company will furnish the architectural terra cotta on the following new buildings: Masonic Temple, Jersey City, N. J., Rowland & Eurich, architects; business building, New York City, Renwick, Aspinwall & Tucker, architects; School of Ascension, New York City,



MAYBURY SCHOOL, DETROIT, MICH.
Light gray brick manufactured by Ohio Mining & Manufacturing Co.
Malcomson & Higginsbotham, Architects.

F. A. De Meuron, architects; building, 20th street and Fourth avenue, New York City, Rouse & Goldstone,



DETAIL BY SCHWARTZ AND GROSS, ARCHITECTS.
Made by New Jersey Terra Cotta Company.

architects; group of College Buildings, I. E. Ditmars, architect.

THE BRICKBUILDER

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LETTERPRESS

TOWER OF THE CHURCH OF SAN FERNANDO, MEXICO CITY, MEXICO.

The dome is covered with colored glazed tiles.

Some Problems in School Planning.

THIRD PAPER — SUPPLEMENTARY REQUIREMENTS FOR ELEMENTARY AND SECONDARY SCHOOLS.

BY R. CLIPSTON STURGIS.

IN the preceding articles an attempt has been made to analyze the teaching requirements of modern schools, both elementary and secondary, as far as their equipment is concerned. It is now proposed to take up the study of what may be called supplementary requirements — first, the necessary space and equipment for care of clothing; second, the space and equipment for administration and teaching force, entrances, stairs and corridors.

The architect now has before him this definite problem: a certain number of rooms of a fixed size and for a definite use which are to be so placed as to be light, convenient and compact, with all conveniences for administration both as regards teachers and children, in addition to corridors, stairs and exits arranged to insure the safety of the children.

When all this has been economically planned it is then the architect's further duty to build of materials which will insure permanency and healthy conditions, especially cleanliness, and to heat, light and ventilate so as to protect rather than endanger the health of the children.

One of the important features of all schools is the disposition of clothing and the location and number of toilets. In elementary schools the pupils' work is all done in one room and it is therefore more convenient to have their outside clothing at the same point. As to the location of toilets there is considerable difference of opinion. Some, looking to the orderly handling of a large number of pupils, have them enter the basement where the toilets are located, so that they may be used before going to class, and so avoid needless leaving of the room during school hours. The toilets in such a system must be sufficient in number to accommodate the children during a brief period. Others prefer toilets located on each floor, do not mass the children on entering, do not dismiss them all at once, and do not require so much toilet accommodation. To concentrate the toilets and provide a large number, or to separate and provide a small number, probably differs little in economy of construction. It is rather a question of school management, and therefore one that the school authorities should study and determine. If the kitchen and shop are in the basement it is necessarily above ground with ample light. As the elementary school often has no gymnasium the rest of the basement is useful as rainy-day space for play.

With the secondary schools it is all quite different. The children it is true assemble at the same hour, but after that it is a constant change from hour to hour. They have a gymnasium and perhaps baths, so there are other things beside outside clothing to be cared for. The constant change from room to room makes it even questionable as to whether books should be in desks instead of in lockers; especially when evening work is to be considered, is it desirable to have the desks clear. It may be that even school desks are undesirable and that a simple light table would serve all purposes best. There is therefore a many-sided problem, the solution of which does not appear to have been found. Metal lockers are expensive, take much space, and both keys and combination locks give constant trouble. If the lockers are conveniently placed for outside clothes they may be inconvenient for books or for gymnasium outfits.

A three-fold equipment may seem extravagant but offers certain advantages:

(*a*) For clothing, one large room with toilets adjacent. If necessary for safety, the wardrobe locked up at nine and opened only by the attendant. Clothing hung in this way takes much less space and is an economical arrangement as compared with clothing hung in lockers.

(*b*) For gymnasium provide small pigeon-holes, 12-inch cubes, numbered for each pupil, and have all clothing, towels, etc., similarly numbered. Provide a hot room where clothing can be aired and dried. It can then be folded and put in small compass. The attendant serving the gymnasium and the wardrobe would do this.

(*c*) Provide pigeon-holes of proper capacity and number in each class room or in convenient space near by for books. Each group of pigeon-holes closed and locked by one bar, to be in charge of the teacher.

If the exercise is largely out of doors, as it should be, it might be well to have a locker building where wardrobe, toilets, baths, dressing rooms and lockers would be grouped together. If this were done there would be no need for a high well-lighted basement, for the kitchen of a secondary school should be near the lunch room, probably on top floor. The gymnasium would serve for a rainy-day play-space, and only the workshop would remain to be provided. This latter would go upstairs, or perhaps better be in a one-story building, hardly more than a shed, outside. Nothing but the heating would then be in the basement, so that the first floor could be nearly at grade.

The question of lockers and their uses raises the whole matter of ordered exercise, and what has been suggested above is in the line of economy. If by proper and justifiable economies in the high school building we can reduce the cost per pupil from \$500 to \$400, or perhaps even \$300 (*i.e.* double the cost of the elementary), let us use a part of the saving in giving the children plenty of play and exercise space. Encourage the use of this space not only in connection with school work, but also outside of school hours; not only by the pupils of that school, but by any other child to whom it is convenient.

This is merely in line with the now recognized fact that our school buildings are too valuable a public asset to lie idle half the time. The halls should be available, when not required for the school, for other public and beneficial purposes; the class room, the shops and the laboratories should be thrown open at night for those who cannot use them by day; and so we justify our expenditure for schools by making the largest possible use of them. Three or four acres of land is none too much for a secondary school which is to serve the community in the best way. If the land cannot be had except by going some distance, is it not worth while to go that necessary distance and get it? The children it cares for are no longer

infants. If the cars do not serve, a bicycle or a pair of legs will. A brisk walk to school hurt none of those who had to take it a generation or two back and will not now. Moreover the school so located will not stay long isolated; houses will spring up about it and it will become a new center.

In a group of buildings for the Normal and Girls' Latin School in Boston an intermediate building served both schools for gymnasium lockers, baths, etc., and it would seem therefore entirely feasible and probably not expensive to have locker buildings adjoining the school, and the playing field or exercise ground serving both. Here would be the place for outer clothing, gymnasium clothes, dressing rooms and baths, and perhaps also the repair shop.

The administration in the elementary schools is very simple. Where it is a lower elementary school and the assistant in charge has a regular class room, no room is needed except one where the teachers can gather at noon. Where there is a headmaster, one small room is ample as an office, for the corridor can serve as a waiting room. In the secondary schools, where the staff is generally larger, the principal would require an outer and inner room, and rooms would be required for both men and women teachers, but neither the space allotted nor the equipment should be other than what a business man would have for his business office.

Entrance stairs and corridors are a fruitful source of extravagance. Often a false idea of the requirements for safety leads to corridors of unnecessary width and to stairs that are actually dangerous because they permit too many children in line. A corridor that will permit two double files of children to pass (about 10 feet) appears to be ample, and stairs that comfortably take one double file (about 4½ or 5 feet), are better than wider ones. Staircases should be placed well apart, so as to give two or more distinct means of exit. Rooms can be planned so that they can be served by the smallest possible amount of corridor, and the stairs so placed that every room will have fairly direct access to either of the two staircases. A plan that does not fulfil these simple requirements ought not to be accepted. Experience would seem to show that as few doors as possible should be between the child in the class room and the stairs, preferably only one, the class room door, placed near the teacher and under her control. These are the chief accessories to the rooms, which must be studied to make the economical plan complete.

In selecting materials for city schools there is but one class that should be considered, the simplest and cheapest of durable, fireproof materials. For finished floors in corridors terrazzo has proven inexpensive and durable and is easily cleaned. For stair treads North River stone seems the most permanent of all inexpensive materials available in the East. A good grade of linoleum glued to a cement surface or to a cast-iron tread has much to recommend it. For class room floors wood is still the best material where desks must be fastened down, but elsewhere linoleum on concrete is better, for it is more durable, cleaner, and more easily taken care of. Everything under foot should be of a material that will not readily create dust by attrition. Removing the dust is an expense, as is also the renewing of surfaces so worn, but the serious evil is the dust in the air, which is injurious to health. As far as possible one may avoid materials that readily create dust, but it is more fundamental to remove the conditions that make material friable.

The heating of our schools is based on the supposition that the only important thing is to take outside air, heat it, introduce it in sufficient quantity and then remove a similar quantity of air that has been vitiated by having been breathed. If it seems worth while to follow up any particular branch of school curriculum and find out if it is producing results, it is certainly worth while to follow up the theories of heating and ventilating and find out what we expect to happen. It is easy to prove that a certain number of cubic feet of air at a certain temperature is being delivered and that a certain number of cubic feet are being withdrawn. It would be valuable for us to prove that the air being delivered is really good to breathe, and that the air we are throwing away has really served its purpose and is no longer valuable. As a rule the heated fresh air has been deprived of all its moisture, and in this condition is not good to breathe. It is the dry air which shrinks the wood, makes floors rub to dust, makes everything brittle and friable and so loads the air with dust. This fresh air is not only dry but dusty, and the dust is often not merely an irritant but an active poison. It is easy to stand a high temperature when the air is dry — conversely a low temperature is comfortable if it be moist. As we provide dry air, a high temperature is demanded. If the air in a class room shows 70°, 6 feet from the floor, it is a matter of conjecture whether the breathed air goes up or down, and it is certainly open to question whether it makes for the outlet and leaves the room as directed.

Until this matter of keeping moisture in the air is solved much money is being wasted in heating plants which are furnishing air dangerous to health and injurious to the building. It is little wonder that there has been such enthusiasm and so great a demand for fresh air rooms, and that children have stood exposure to cold and thriven on it, for they have been breathing air that is naturally moist. If we could give our schools moist air in winter there would be no demand for rooms at 70°, and fewer children would be found who required open air or fresh air treatment. Incidentally the building would benefit and there would be smaller bills for repairs on floors, doors, sashes and window cords. This is one of the important fields for study. Here the knowledge of the physician and the physicist should supplement the study by the architect and the results of each experiment should be tested until there is reasonable assurance that the object aimed for has been attained.

Economical school planning is then a joint affair where all those interested must work together. The teachers and school authorities must determine what is essential and what is non-essential, and how much of the latter they can afford. Physicians and teachers of hygiene and athletics must determine what is necessary for that physical condition of the child which will enable him to take advantage of the mental training offered him. The architect must enter sympathetically and intelligently into all these problems, share in the study and bring to a final solution his knowledge and experience as a true master builder.

Legal Hints for Architects. — Part I.

BY WILLIAM L. BOWMAN, C.E., LL.B.

THE architect is primarily an artist, and, as Ferguson, the historian of Architecture, asserts, "his object is to arrange the material of the engineer not so much with regard to economical as artistic definiteness, and by light and shade and outline to produce a form that in itself shall be permanent and beautiful." The artistic temperament required to produce "frozen music," as architecture is so aptly termed by Schilling, has no time and little use for the sordid details and requirements of business. Architecture and business are truly antitheses, and in this respect history is replete with the calamities of genius. As our scientific knowledge has grown apace, so the requirements and demands upon the architect have increased, and yet, notwithstanding these changes and the fact that we live in a very material age, many an architect to-day, as of old, is essentially an artist and dreamer. His inability to comprehend and care for business details or to protect himself from the guile or imposition of his fellow-men is a phase of life with which the lawyer is especially familiar. The writer's experience with such situations and the righteous indignation and pity thereby aroused accounts in a large measure for these articles, in which an attempt will be made to present the most common pitfalls of the profession as are shown by everyday examples and to suggest possible ways and methods of overcoming such difficulties. While most of the important legal questions with which the architect should be familiar will be considered, naturally such considerations must be very general and brief. It is hoped, however, that these general considerations (which must not, of course, be relied implicitly upon for any specific case) will not only be of benefit and aid to architects, but that with such knowledge the architect will in turn minimize the difficulties and disagreements which are bound to arise between architects, owners, builders and contractors.

Before Employment.

Statutes. Consideration of situations arising before employment involves the preliminary questions as to whether one is an architect and whether he is legally entitled to practise. The law requires that an architect shall have at least the ordinary skill, knowledge and judgment possessed by men of his profession. Since the possession of such qualifications is a condition precedent to the recovery of remuneration for any services, it is incumbent upon the architect-to-be that he believe and know that he possesses the requisite skill and experience.

Although the Fourteenth Amendment to the Constitution of the United States provides that no state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States, yet it has been judicially decided that the right to practise a profession does not come within the Constitutional equality of privilege; hence it is that the various states are able to pass the now familiar laws for the protection of the general public, requiring the examination, registration and licensing of doctors, lawyers, dentists, etc. Upon the same principle, Illinois, in 1897, passed an act which provided for a State Board of Examiners, and compelled all practising architects, and all persons thereafter intending to become architects, to comply with certain conditions or be guilty of a misdemeanor, which carried as a penalty a fine of not less than $50 nor more than $500 for each and every week during which the offense was continued. Thereafter two other states, New Jersey and California, followed suit, but as the provisions of their laws are based largely upon the Illinois statute, we will only consider briefly some of the details of the original statute.

In Illinois, a person desiring to become an architect must be over 21 years of age; must pay a fee of $15 to take an examination with "special reference to the construction of buildings and a test of the knowledge of the candidate of the strength of materials, and of his or her ability to make practical application of such knowledge in the ordinary professional work of an architect and of the duties of supervision of mechanical work on buildings, and should also seek to determine his or her knowledge of the laws of sanitation as applied to buildings." After the examination is passed satisfactorily, then the Secretary of the State Board of Examiners issues a certificate and upon the payment of $25 a license is issued permitting the person to practise architecture. Regarding practising architects, the act provides as follows: "Any person who shall by affidavit show to the *satisfaction* of the State Board of Examiners of architects that he or she was engaged in the practice of the profession of architecture on the date of the passage of this act, shall be entitled to a license without examination, provided such application shall be made within six (6) months after the passage of the act," etc. The "satisfaction" required by this law makes it discretionary with the Board of Examers as to whether or not they will grant a license, and it has been held that in the absence of a wrongful abuse of such power amounting to fraud against the rights of the applicant, the Board could not be mandamused and compelled to issue a license. In this connection, and as it is human for a person to enlarge upon the work which he has done in the past, practising architects should be very careful that an affidavit made for this purpose is absolutely and unqualifiedly truthful, because there have been instances where a license has been refused solely upon the ground that the applicant in his affidavit had prevaricated.

One of the most important provisions of this law is that each licensed architect shall have his or her license recorded in the office of the County Clerk in each and every county of the state in which the holder thereof shall practise, and failure so to do shall be deemed sufficient cause for the revocation of the license.

Said law further provides that licenses may be revoked by the unanimous vote of the State Board of Examiners for gross incompetence or recklessness in the work of construction or for dishonest practice. It is also required that an annual fee of $5 be paid to the Secretary of the Board, who shall thereupon issue a certificate of renewal, and any licensed architect who shall fail to have his or

her license renewed at the proper time shall have his or her license revoked at the discretion of the Board.

So far we have considered only individuals. The law further provides that in the case of copartnership of architects each member whose name appears must be licensed to practise. No stock company or corporation will be licensed to practise architecture, though they may employ licensed architects. The above are the important requirements of the Illinois statute, which are more onerous than the later laws on the subject.

It should be noted that the Illinois statute does not contain any provisions regarding the practice in Illinois by architects of other states; hence, it is to be assumed that if an architect desires to practise even temporarily in that state he would have to comply with the provisions of the law. Under the California law this situation is covered by a provision permitting a temporary certificate to be issued upon the presentation of satisfactory evidence to the Board of the District in which the structure is to be erected, that the architect is a competent architect, etc.

The New Jersey laws in addition to a fine for failure to comply with the law, permits also imprisonment in the county jail for a period of not less than one month.

It is very probable that other states will follow with similar statutes and it therefore behooves all architects and those intending to practise architecture to consult the state laws or some attorney in this regard and thus save themselves possible expense, time and mortification.

There is still another class of legislation which architects must beware of, and that is municipal or town taxes upon their profession; for example, the following is such an ordinance: "No person, firm, etc., shall be engaged in prosecuting or carrying on any business or profession hereinafter mentioned without having first paid a special license tax therefor, as follows, to wit, architect, civil engineer, surveyor, for either $15." It is often a serious question whether an architect is carrying on his profession within the scope of such an ordinance. The following facts show how far this tax is upheld. A certain firm of architects resided and had offices at A. They solicited and superintended certain work at B. The town of B had such an ordinance and compelled the architects to pay the license tax. Said tax was paid under protest, and the architects thereafter sued to recover their money, on the ground that all of the plans and details had been drawn at their offices at A, hence they were not liable for "carrying on business" in B. It was decided, however, that it was apparently their intention to carry on part of their business at B and that they must pay the tax.

The above considerations call for the following recommendations:

First. That no person should consider practising architecture unless he knows that he has the requisite skill and experience.

Second. Practising architects and would-be architects should annually ascertain whether any state laws have been passed governing their profession, and, if so, carefully follow each and every provision of said law.

Third. Ascertaining whether or not there is any municipal or town license tax required by any of the municipalities or towns where the office or any of the jobs are situated.

Fourth. Before taking employment in another state to be sure and ascertain the statute requirements of such state.

Employment Classified. Assuming that the architect has complied with the state and municipal requirements which are conditions precedent to his practising his profession, it will be found important definitely to consider his possible employment under the following headings: (1) By an individual; (2) by a business corporation; (3) by a municipal corporation; (4) by a state or the United States; (5) by competitions.

There are a few general preliminary rules which apply to all employments. The first one and the most important is to always have the terms of employment in writing, as this safeguard will obviate many disputes as to whether there has been an employment, and further difficulties in recovering compensation where it is necessary to resort to law. A convenient, though of course not absolutely binding method, is to write a letter of confirmation of an oral employment. In this connection, it should be noted that the Statute of Frauds in most states requires that any agreement not to be performed within one year from the making of the agreement must be in writing, otherwise said agreement will be void and unenforceable.

(1) Employment by an individual is the least dangerous of any of the classes to be considered. The chief things to keep in mind and have clearly understood are, who is your employer, what you are to do, and how much and when the employer is to pay.

A few illustrations will show the importance of knowing by whom you are employed. In one case the architect was visited by A, whom the architect knew was not financially responsible. Upon being asked to prepare plans for an apartment house he assumed and supposed that A represented his wife (B) and her father (C). Rough sketches were drawn in accordance with A's suggestions and they were marked "A & C." Later A told the architect that C did not want his name to appear. At a still later conference, A showed the architect a plot, stating that C owned one half and that he (A) controlled the rest. The plans were completed and the building put up upon the plot and the architect received a payment from A, who later refused to make any further payments. The architect thereupon sued the wife, B, and the father, C. Upon this evidence he had to discontinue his action as to B, and his recovery against C was reversed on appeal because the Court held, that if there was any obligation on C's part, it was joint with A. In another case, the architect went to A, who was a large real-estate dealer interested personally and as director and officer of several corporations in the promotion and sale of real estate. The architect was employed to draw up a scheme for the general improvement of a large tract including buildings, and to assist him he was given a map of the property. Nothing was said as to the ownership of the property and the architect assumed that he was personally employed by A, whom he knew to be responsible. After the plans were completed and submitted, nothing was done, nor could the architect secure any further information regarding them or the contemplated work. Upon a suit being brought against A to recover for the services, immediately upon the map being put in

evidence the Court dismissed the case, since on the back of the map it appeared that the property belonged to a corporation, and it was held that such information was notice to the architect that the property belonged to the corporation, and there being no evidence, of an absolute promise on the part of A to pay for the plans, there could not be a recovery from him personally. Of course, as usual in such cases, by the time the case got to trial and was dismissed, the corporation was bankrupt.

In another instance a town committee of which A was spokesman were raising money to put up a building to induce a manufacturer to locate there. A and some other committeemen called upon the architect, telling him their purpose and suggesting that he get up some plans for the building. He did so and after they were completed then took up the question regarding payment for the same. Upon the trial there was a conflict of evidence as to whether or not the defendant A promised to pay the architect subsequent to the completion of the plans. A judgment was recovered by the architect, but upon appeal it was reversed on the ground that there was no fair preponderance of evidence of any express promise to pay for the plans on the defendant's part, and if the work was not done on the defendant's credit, but for some other person or party, any subsequent express parol promise of the defendant to pay the same would be void as a promise to pay the debt of a third party.

Another common case was where certain promoters acquired property for speculative purposes, which property was later turned over to a syndicate in which the promoters held a half interest. A trustee was appointed by the syndicate to develop, manage and sell the same. The promoters had an architect do certain work, including the designing and drawing of plans for a hotel to be erected upon the property. After the work was done, the syndicate refused to pay for the same, and upon suit being brought it was held that the authority of the promoters to bind the syndicate did not extend beyond the purposes of the enterprise, namely, the development, management and sale of the land, and that the construction of such a hotel as planned was not presumably one of the purposes of a speculative acquisition of suburban real estate and hence the syndicate were not liable.

As is shown by these few examples, it frequently happens that if the architect fails to recover against the party sued, he still has his rights against some other party, but it is almost the invariable rule that in such instances the other party is either financially irresponsible or has, during the time consumed waiting for the trial, appeals, etc., so arranged matters that the result of an action against such party would be very questionable. Of course, the chief reasons for this difficulty are the delays of the law and the expenses involved in carrying on litigation, with the possible chance of the running of the Statute of Limitations, especially where the attorneys for the defendant do everything to delay matters.

The most serious question, namely, as to whether or not you are employed, always involves the question as to whether or not the contract for employment is conditional. Without a doubt, the bane of the architect is the conditional job. Young architects especially are prone to waste valuable time and money in drawing plans for irresponsible parties or promoters in the hope of securing employment. Except on careful consideration, no architect should make his compensation conditional upon suiting the client's taste or until the sketches meet with the client's approval, since that condition involves a personal equation which is sometimes impossible to overcome. In a written proposal an architect agreed that the client would be under no obligation until the sketches met his approval, and should the architect at any time before said approval become in any way unsatisfactory he would retire upon return of all the sketches, without claim for any services performed. Of course, notwithstanding this agreement, the architect, after spending several thousand dollars' worth of time and materials, etc., considered that he should be compensated, and sued accordingly, but of course with no success. If there is no written evidence of the employment sufficiently exact in its terms to make a complete contract, you can always count upon the employer finding some condition which was a precedent to the architect's employment or receipt of remuneration. The usual conditions concocted to cover disagreements as to the question of employment are that the plans were to be satisfactory to or approved by the employer; or that the plans were to have been for a building of a certain cost; or that the architect was to procure contracts for erection within or near his estimates of cost; or that his employment was conditional upon the acquisition of a certain lot or tract of land, or upon the use of certain property for certain purposes. Of course, if the client can prove to the satisfaction of a jury that any of these conditions were conditions of employment or of the right to remuneration, the architect naturally loses not only his time, labor and expense, but he is further burdened ordinarily with the costs given against him in the action, in addition to his own expense for witnesses and attorney. A few examples of how these conditions have worked will very quickly show the importance of this matter. Upon a trial the evidence showed that the architect had prepared preliminary sketches for the erection upon premises owned by A of a building costing over a million dollars. These sketches or plans were prepared in order that they should be submitted for consideration and selection. A kept them in his possession for several months, and upon five or six occasions the architect visited him in regard to the same. The evidence further showed that A, who had died before the action came to trial, had told another witness that he had had plans prepared for a building by the architect, that he liked them very much and approved of them, and that according to the plans it would pay him to make the investment and put up the building. Later the plans were returned and the property sold, and A refused to pay the architect. The court held, and it was sustained on appeal, that there was lack of proof of an employment of the architect, upon the ground that from this evidence and from the fact that no use was ever made of the plans and no building ever erected, there was no acceptance of the services proven from which either an employment or an acceptance of the services could be inferred. It was further held that there being no employment proven, there could be no recovery of the value of the services on *quantum meruit* or reasonable value.

Probably the most usual and popular condition attached

to an architect's employment is the condition that he shall give his employer a building which shall cost within a certain fixed sum. On account of the fact that the architect's remuneration is some percentage of the actual cost of construction, the general public immediately assume that which sometimes is the fact, that the architect tries to make a building cost as much as possible to increase his compensation. The law as regards employment by others than municipal or governmental bodies is well settled, that where the owner stipulates that the plans and specifications shall be for a building not to cost over a specified amount, the architect must draw the plans and specifications for a building to cost reasonably near that amount, otherwise he fails to live up to his contract and cannot recover for his services. For example, it has been held that an employment to prepare plans for a house to cost $100,000 where the contractor's estimate, including architect's fee and superintendence, was $107,500, and also in another case where the plans were to be within $50,000 and the estimate was $52,500, and in a further case where the plans were not to exceed $2,500 and the estimate was $3,100, that in each case there was a substantial performance and the architect could recover his compensation for such plans and specifications. The following are cases where recovery was not permitted, namely, where the contract called for a building to cost $4,300 and the lowest bid was $7,000; where the cost was to be $18,000 and the lowest contract offer was $35,000; and where the cost was not to exceed $4,500 and the estimate was $8,000.

These considerations show that even when dealing with individuals an architect should have the contemplated cost of the proposed building for which he is to draw plans in writing and he should further know and have a contractor willing to undertake the construction according to the plans and specifications prepared for a price not to exceed such cost.

This raises another serious problem for the architect since primarily he is employed to furnish plans and specifications for the erection of a building and is only entitled to remuneration therefor if they are made in accordance with the direction of the owner. When the owner wants gold trimmings for his bath tub, it is very difficult to plan a suitable house and include such a fixture for $5,000. This question becomes of such serious importance in employment by municipal and other governmental bodies that further discussion will be temporarily deferred.

The following illustration shows that inequitable results are often reached by a conditional contract. A was the owner of a large tract of land. He entered into an agreement with B, an architect, that the latter should lay out A's land, have it surveyed, make plans, etc., as to where houses should be constructed and determine their style as required by the natural situation; that B was to make no charge whatever for such services, but that in the event of any of the land being disposed or let for building purposes that then B would be appointed architect on A's behalf to see that the building construction, etc., was proper, etc., and that parties building on the land should pay B one and one-fourth per cent of the outlay, provided they did not employ B as their own architect. The agreement further provided that in the event of A or his executors wishing to dispense with B's services at any time he, or they, should be at liberty to do so, with the understanding that he or they should remunerate B for the time, trouble and expense he had been put to in making his preparations. Thereupon B went ahead, had the land surveyed, expended large sums of money and time in making plans, etc. A then died and his executors sold the land, but not for building purposes, and also dismissed B without any remuneration. Upon suit being brought, the Court held that there should be no recovery for the work done, because the only event upon which the architect was entitled to remuneration had not happened, namely, the disposal of the land for building purposes. The theory of the Court was that under the circumstances, the land not having been disposed of for building purposes, the services of the architect were not necessary, and since he had contracted with that contingency he should be held to the strict terms of his contract.

GREENHOUSE AT TUXEDO PARK, N. Y.
Donn Barber, Architect.

Second Precinct Police Station, New York.

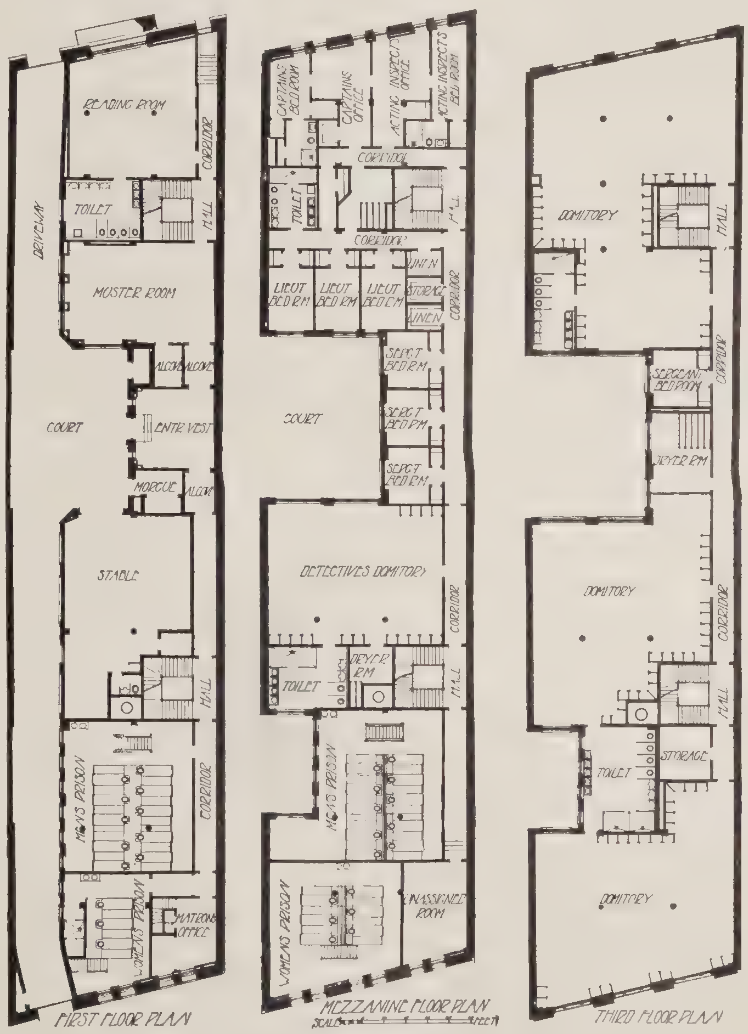
STOCKTON BEEKMAN COLT AND THORNTON CHARD, ASSOCIATED ARCHITECTS.

THE new Second Precinct Police Station, which has been completed recently, is situated at 156-158 Greenwich street, running through some 250 feet to Washington street. This is one of the four new police stations planned under the administration of Gen. Theodore A. Bingham, Police Commissioner of the City of New York, to replace old buildings which are poorly equipped for patrolmen, prisoners and administration.

The first and mezzanine stories are of granite with wrought-iron window guards, gates and lamps; while the superstructure is of impervious red brick. Steel floor beams and girders with terra cotta floor arches and partitions of fireproof blocks are used throughout. The public floors and corridors are finished in cement and terrazzo, while the vestibule and muster room are wainscoted in marble. In addition to the two main staircases of iron and slate provision has been made for an elevator, which will give ample and ready access to all parts of the building.

The interior arrangement, especially on the first floor, is a departure from the stereotype New York City police station. The idea is to give as much privacy as possible to the muster room containing the lieutenant's desk, as well as to the entrance where the patrol wagon discharges prisoners. To this end the main entrance is situated in a central court, accessible by a driveway from both Greenwich and Washington streets. This feature serves the double purpose of privacy and security. Heavy iron grille gates guard the driveway entrances, which may be closed in case of riot or to prevent curious persons from entering the court. All the undesirable excitement and interferences attendant on the arrival of a patrol wagon at the door of the old type of police station with its muster-room entrance and windows on the street is here avoided.

Directly off the court is the entrance to the stable which is separately ventilated and equipped with open stalls and quick-hitching apparatus. These quarters are also prepared for the storage and care of automobiles. Accessible from the court are two isolated rooms with special arrangement for sanitation and ventilation, one is the morgue and the other a gasoline pump-house for the automobile service. The latter room is separately ventilated on account of gasoline fumes while an electric fixture is especially provided with a double-glazed electric lamp.



PLANS OF SECOND PRECINCT POLICE STATION.

At the Greenwich street front is a separate entrance for reporters, admitting them by private corridor direct to the muster room. The ground floor provides for a reading room and recreation room for the patrolmen, with toilet adjoining. In the rear of the building, on Washington street, are the cell rooms. These cells are of the most recent pattern, and extend three tiers in height. They are equipped with modern devices for sanitation and ventilation. There are two departments, one of thirty cells for men, and another of fifteen cells for women. The cells and window bars are of tool-proof steel with interlocking connections. Adjoining the women's department are the quarters for a matron.

The upper stories of the building are arranged for sleeping quarters, with twelve private rooms and toilets for the officers and nine dormitories, accommodating some one hundred and sixty men. There is also a separate dormitory for detectives. All these quarters are equipped with comforts consistent with discipline and economy, each dormitory having numerous ventilated lockers in addition to ample lavatories, showers, and drier rooms for wet garments and boots.

The sleeping quarters have been planned inexpensively with the sanitary and hygienic principles carefully considered, the air space allotted to each bed being equivalent to that prescribed for hospitals. Hospital finish has been used throughout and ample window space furnished. On the roof is a large deck-house which may be used ordinarily for a gymnasium and in time of riot for a kitchen and mess hall. In the cellar are located the boilers, coal storage, pumps and repair shop, with ample storage rooms for ballot boxes, proceeds of raids, etc.

The contract price for the entire building, complete, amounted to approximately $183,000.

WASHINGTON STREET FACADE.

BATTERY OF CELLS, MEN'S DEPARTMENT.

CENTRAL COURT.

SECOND PRECINCT POLICE STATION, NEW YORK CITY.
S. B. Colt and Thornton Chard, Associated Architects.

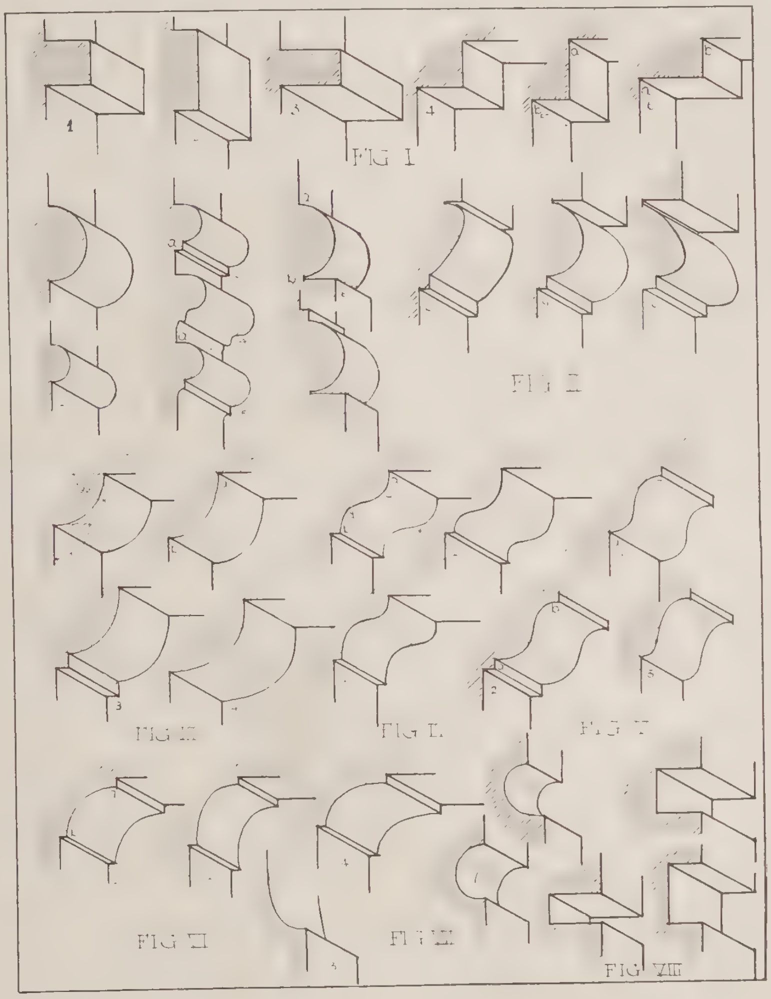
The Principles of Architecture.—III.

BY WILLIAM L. MOWLL.

Classical Profiles.

THE two elements of visual effect of which mouldings are made up are contrast and gradation. Mouldings are seen by the effects of light and shade on their surfaces. The degree of these effects varies with every change in the amount of light, so that it may be said that the contrasts and gradations characteristic of each are contrasts or gradations of surfaces. It is a matter of common observation that the relative effects of mouldings and their parts are the same in all lights. Strong and weak, brilliant or flat, they are always seen to be the same kind of surfaces.

Analysis of the surface contrasts of each moulding explains the origin of the feeling of its character.



The fillet, Fig. I is formed by the intersection of three planes, two parallel and perpendicular to a third, and is symmetrical. It presents the maximum of contrast in a single moulding form. It seldom appears without modification, or in large dimensions, because the abruptness of its contrasts are such as to withdraw attention from other neighboring objects. On account of its absolute balance it can be used unmodified only where a vigorous check to movement is required.

The fillet as used at the intersection of major planes or planes and curves is formed by the intersection of two planes perpendicular to each other. It is again practically symmetrical when the two faces are equal. It is in this form an arrest, and since in few instances is a pause desired in a set of mouldings, it is seldom so used. In the form shown at Fig. I.5 the vertical face makes a more emphatic contrast at (*a*) than at (*b*) because the vertical face is broader than the horizontal. The general effect is unbalanced with a suggestion of movement upward and outward. The form at Fig I.6 is rare as its suggestion of movement is not that generally sought. This most "contrasty" moulding is rarely used as a principal section but is very frequently found as a minor moulding where, used at a relatively small size, its function in diminishing a contrast by breaking it up into small areas or strips will be illustrated in connection with the other profiles which follow.

The half-round section, Fig. II.1, has a surface which presents a full gradation and two contrasts only less strong than those of Fig. I.1. The surfaces are similar in their hold on the attention. The torus is never used in the ascending portions of any arrangement because the vigorous hold of its symmetry is destructive of movement. Even when the astragal is so used it is invariably with the accompaniment of a fillet below the main portion of the moulding. In Fig. II.2 the mass is evenly divided. In Fig. II.3 the larger portion is above. In this respect the effect would be similar if the shape were as at Fig. II.4. The latter example has however no definition, and consequently little interest. The sharp contrasts in Fig. II.3 contribute much better to the purpose of the moulding. Then instead of softening off below, the fillet at (*a*) Fig. II.3, not only disturbs the balance but breaks up and diminishes the contrast below by making the surfaces which intersect with each other narrower. That this is the intention is shown where this feature, commonly used for the neckings of columns, is completed as at Fig. II.5. The quarter-hollow below still further diminishes the contrast, while allowing in many examples the formation of an actual plane surface at (*a*), on the top to increase the contrast at that point.

The torus placed at the base of a surface as in Fig. II.6, gives no special sense of direction when unaccompanied or unmodified. In this arrangement commonly used, the contrast above at (*a*), although different from that below at (*b*) is more or less its equivalent. Both are secondary in interest to the symmetry of the torus. A fillet placed above the torus again performs the office of disturbing the balance and breaking up the contrast as in the case just cited, permitting the combination to convey an impression of pressure downward which is, in common with other bases in all styles, the only exception to the general rule that throughout architecture all movement

is upward. When the half-round is used in capitals it is deformed so as to make the major contrast or interest fall in the upper portion, so as to cause the form to be unbalanced upward. Compare Fig. II.8, the type usually occurring with Figs. II.9 and II.10, in which the contrasts or form masses fall lower down.

The "quarter-round," shown in Fig. III.1 is never effectively used in the form which the term signifies. That section is as dead and characterless as the fillet with equal faces. A preponderance of one dimension of its section over the other at once removes the immobility of the quarter-round. The curve at (*a*) leaves its tangency to the vertical plane more slowly than at (*b*) so that the contrast at (*a*) is more marked. There is more of the mass of the moulding at the side (*a*). The suggestion of the movement is upward. This is the more marked if the angle at (*b*) is broken up by a fillet. This has the further effect of actually disturbing the balance or approximate balance of the ovolo. The surface Fig. III.1 is nearly a balance, practically a quarter circle, and the eye finds little reason for seeking one edge rather than the other. In Fig. III 3 there is presented a larger mass at one side and a smaller at the other.

These angular and convex mouldings together with those of the group about to be described are frequently distinguished from all others as mouldings of support or footing because of their stronger effect. This character is attributable to two causes, one structural and the other due to visual effect. The convex mouldings permit the forming or construction of projecting parts with less prejudice to the security of the material of which the parts are made, both while the material is being formed and while it is subjected to the stresses which it must resist in the structure. The larger factor however is the superior attractiveness of the angular and convex forms which they owe to the strong contrasts and gradations formed on their surfaces. In illustration of this idea the modillions or brackets of the Corinthian order are excellent examples. This well known form which has been repeated myriads of times may have had its origin in the adornment of the end of a projecting beam, but in its shape it has not the slightest suggestion of structure. Its lines are such, in fact, as to ignore connection either with the wall or the under side of the cornice. Their value is purely optical. Interesting objects of form contrasting with that of other parts of the entablature in the upper portion of which they are placed, they serve continually to distract attention from its lower to its upper portion and thus to contribute to that intangible current of movement in which ideas of support and lightness are confounded.

The next moulding forms to be considered are those of double curvature, which naturally in characteristics stand between the convex and the concave surfaces and vary in force according to the degree in which the convexity or concavity predominates.

The cyma reversa, Fig. IV.1 has always a definite direction because it has a major contrast, (*a*), placed unmistakably at one side of the form. Because of the certainty of the direction of these mouldings they contribute to a lighter or "quicker" general effect than those just considered. The cyma reversa makes one contrasted junction with the adjacent surfaces at (*a*) like that which the ovolo makes, and at the other edge (*b*) is prevented from gliding unmarked into the surface below by a fillet of two contrasts. The degree of movement across the surface depends upon the relative amount of hollow. As the hollow increases in relative size as in Figs. IV.2, and IV.3, the amount of convexity and the contrast at that edge are diminished until their effect is seriously rivaled by the fillet on the other edge.

Fig. IV.1 is "stronger" in support than Fig. IV.3 because its effect of the asymmetry is stronger. There is more difference between the mass (*c*) and (*d*) in Fig. IV.2 than the similar masses in Fig. IV.3, thus producing a more marked asymmetry. Movement may be said to have two characteristics which are represented by the ovolo and cavetto — volume and rate. The ovolo is stronger and more sluggish, the cyma reversa has less force and more vivacity.

The cyma recta is not at all adapted to the suggestion of support as are the preceding sections in varying degrees. Its main masses, contrasts or interests are not unquestionably unbalanced. In the form shown at Fig. V.1 the larger contrast is at (*a*). This contrast is generally diminished by placing a fillet at (*a*) as in Fig. V.2. The main contrast is even then not clearly shown at (*b*). The upshot of this hesitation is that the moulding is not adapted for suggestion of support but rather for an arrest, without marked balance, in positions where that suggestion is required. It is, consequently, most used for crowning sets of mouldings or divisions of a composition.

Moulded surfaces which are altogether concave in section are less capable of variety of interest than other sections. They have, on the whole, less light on their surfaces so that less striking gradations are formed with less brilliance. This contrast which they form with the surface upon which they are placed is their chief characteristic. The "quarter-hollow" forms continuous junctions with each of the adjacent surfaces, (*a* and *b*), Fig. VI 1. This surface is balanced. There is possibly a suggestion of movement across the surface, Fig. VI.2, upward. The hesitation is due to the slight lack of balance. The congé shown in Fig. VI.3 is slightly more emphatic because of the absence of one of its fillets, leaving to the other more unquestioned supremacy. This is the only common example of the use of a moulding with an unmarked "gliding" junction.

The cavetto shown in Fig. VII gives a strong line of shade, less strongly marked by gradations because of the exclusion of light. It is in this form strongly symmetrical. The symmetrical hollow is generally used vertically to serve as a guide as in the Doric columns discussed in a preceding chapter. In bases it is used unsymmetrically, its departure from balance agreeing with the movement of the base downward.

The channel shown in Fig. VIII is a harsh and "contrasty" moulding form comparable to the fillet of which it is the inverse. It should probably be placed with the fillet in grading the sections in the order of their force.

The comprehension of these visual effects is the key to much hitherto unexplained in this art. They are a part of the pure or inorganic design of architecture.

Main Waiting Room.
Entrance Lobby.

CHICAGO AND NORTHWESTERN RAILWAY STATION, CHICAGO, ILL.
Frost & Granger, Architects.

Concourse.
Entrance Lobby.

Burned Clay in the New Chicago and Northwestern Station.

WITH the opening of the new terminal station at Chicago, of the Chicago and Northwestern Railroad, a worthy gateway is flung wide to the golden west.

The thought and care of years have been crystallized and built into tangible form, and the crowding throng of suburbanites and general traveling public have rushed in, with their wide variety of wants, and have found them anticipated and provided for.

Five years of construction have followed on after many years of careful study and planning; $23,000,000 expended; four hundred and fifty-five buildings wrecked to make place for the new structure covering twenty acres; two hundred and twenty-six caissons extending to bed rock more than 100 feet below; forty-three thousand separate piles; thirty-seven thousand tons of riveted steel; five different switch towers operating six hundred levers; all manner of electric elevators for handling passengers, baggage, etc.; rest rooms with toilets for passengers and employes; and a smooth running arrangement for shunting one lot of passengers in and another out without mixing.


DETAIL IN TEA ROOM.

In entering this station at the street level one finds himself in a room a block long through which are vistas between forests of fluted enameled terra cotta columns each of which is joined to four others by elliptical soffit arches of enameled terra cotta. Over this and filling in between are the groined ceiling arches of tiling of a lighter tint, while the wall surfaces are of a cool green enamel tiling.

The traveler, ticketed and checked, passes up the main stairway into the concourse, another room a block long and as clean and bright as the one below, but with a high beamed ceiling of enameled terra cotta. Here again the walls are of the soft green tile. Adjoining this concourse and on the same floor is the main waiting room with a high vaulted ceiling spanned by big ribs of terra cotta in tints of green and cream. The decorations in the ribbed terra cotta vault overhead are done in drive wheels, engine bells, wrenches, headlights and hammers. Out of this room on the different floors are dining rooms, barber shops, bath rooms, dressing rooms, rest rooms, smoking rooms, and a fully equipped hospital. Particularly notable is the tea room in green-enameled tile, around which is a frieze of country landscape executed in tile.


TEA ROOM.

In this new station burned clay in its various forms has been used extensively for constructive and decorative purposes. The architects and railroad officials have here paid tribute to its value in a work of this character. Its brightness, which is easily maintained, gives a feeling of cleanliness, its colors add a cheerful note to the ensemble, and the fire-resisting qualities of the material insure permanency.

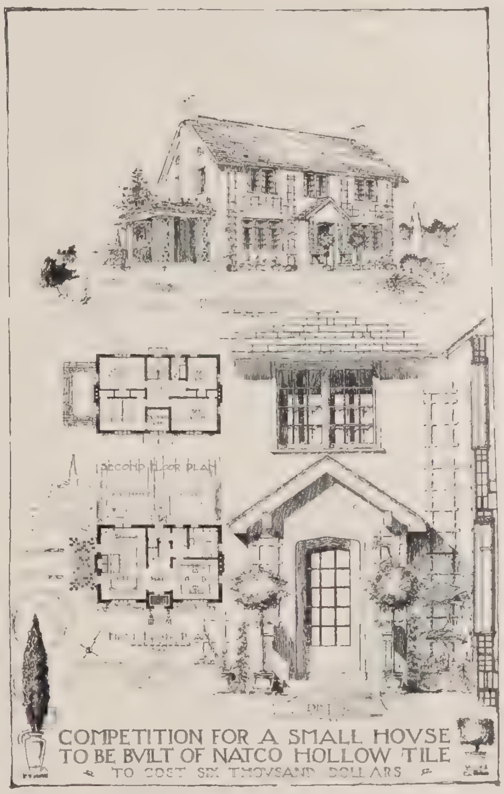
The exterior of the main building is mainly granite, although terra cotta has been used on the high parts, which, while matching the granite in effect, is lighter for the steel to carry and at the same time has a fire resistance much greater than the granite. The balance of the building stretching down three entire blocks is of brick and terra cotta, while the endless array of rooms for all the multitude of uses are in enameled clay finish clear down to and ending in the enameled walls of the big power station.

Competition for a Small House to be Built of Natco Hollow Tile.

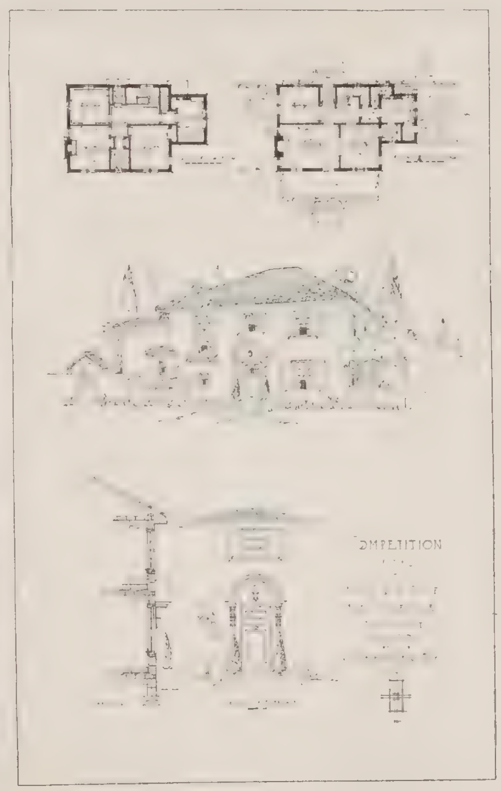
REPORT OF JURY.

THE jury selected to award the prizes in THE BRICKBUILDER competition for a small house to be built of Natco Hollow Tile, at a cost not exceeding $6,000, have examined the two hundred and fifteen designs submitted and find that a very large number were of a high order of merit and demonstrated the possibility of adapting the material specified to a great variety of style and construction.

The jury regrets that a number of the best designs, from both an artistic standpoint and from the standpoint of adaptability, were excluded from competition owing to excessive cubage, as the limit placed upon the size of the building in the program was made mandatory. The jury feels that several of these designs were of the type which should be most encouraged in work of this nature and express the hope that in future competitions greater care will be exercised by those men who undoubtedly had offered the most pleasing solution of the problem.



Submitted by L. E. Varian, Denver, Colo.


Submitted by H. H. Wrenn, Norfolk, Va.

TWO DRAWINGS IN THE COMPETITION FOR A SMALL HOUSE OF NATCO HOLLOW TILE.

In making the award, the jury finds that the design submitted by Mr. Walter is a charming example of the style chosen and is developed from an excellent plan. The plan contains all the essentials of a house of this size, arranged in a most convenient relation. The design, however, is handicapped by a poor presentation which prevents the full possibility of the house being apparent on first examination.

The second prize was awarded to the design submitted by Mr. Lehti. This design presents a house of great simplicity and charm of proportion and composition, but upon analysis it is apparent that this charm of composition has been obtained at the expense of a practical interior — all of the second floor rooms being badly cut into by the roof. The detail employed is restrained and in sympathy with the simple lines and surfaces of the composition.

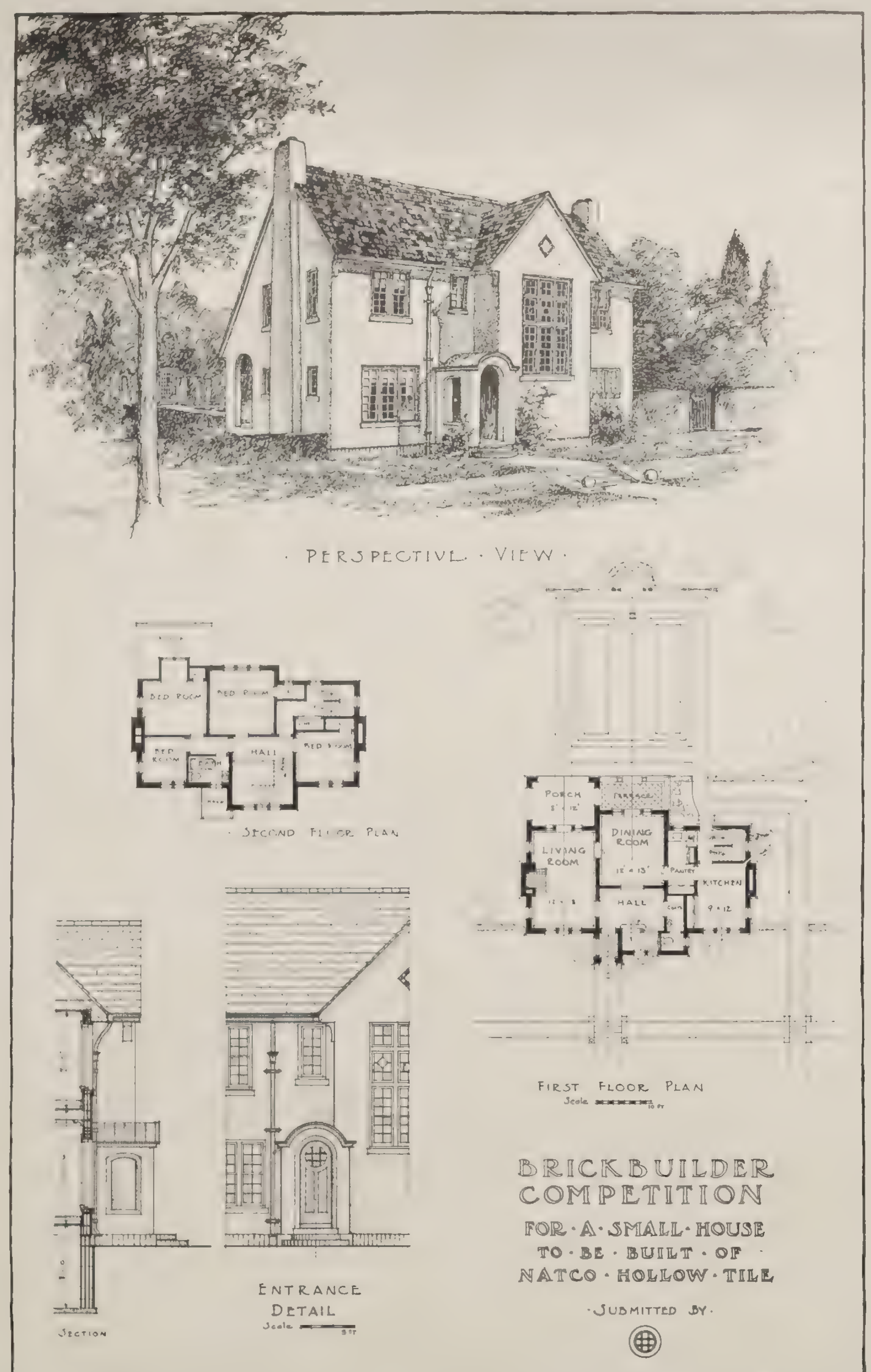
In the design placed third Mr. Bohacher presents a house of a distinctly different type. The design of the exterior is particularly well suited to the material specified. The fenestration together with the large unbroken surfaces of wall, while pleasing in execution and making possible an economic use of tile in the walls, is not an expression of the plan or a logical and sincere development of the house as planned.

The fourth prize has been awarded to Mr. Bulman, who shows a compact type of building of formal design, which formality, however, is attained by an extremely simple use of the material required. The character of detail employed is commended as being in strict harmony with the simple dignity of the whole composition. This house would be well adapted to a small lot developed as a formal garden.

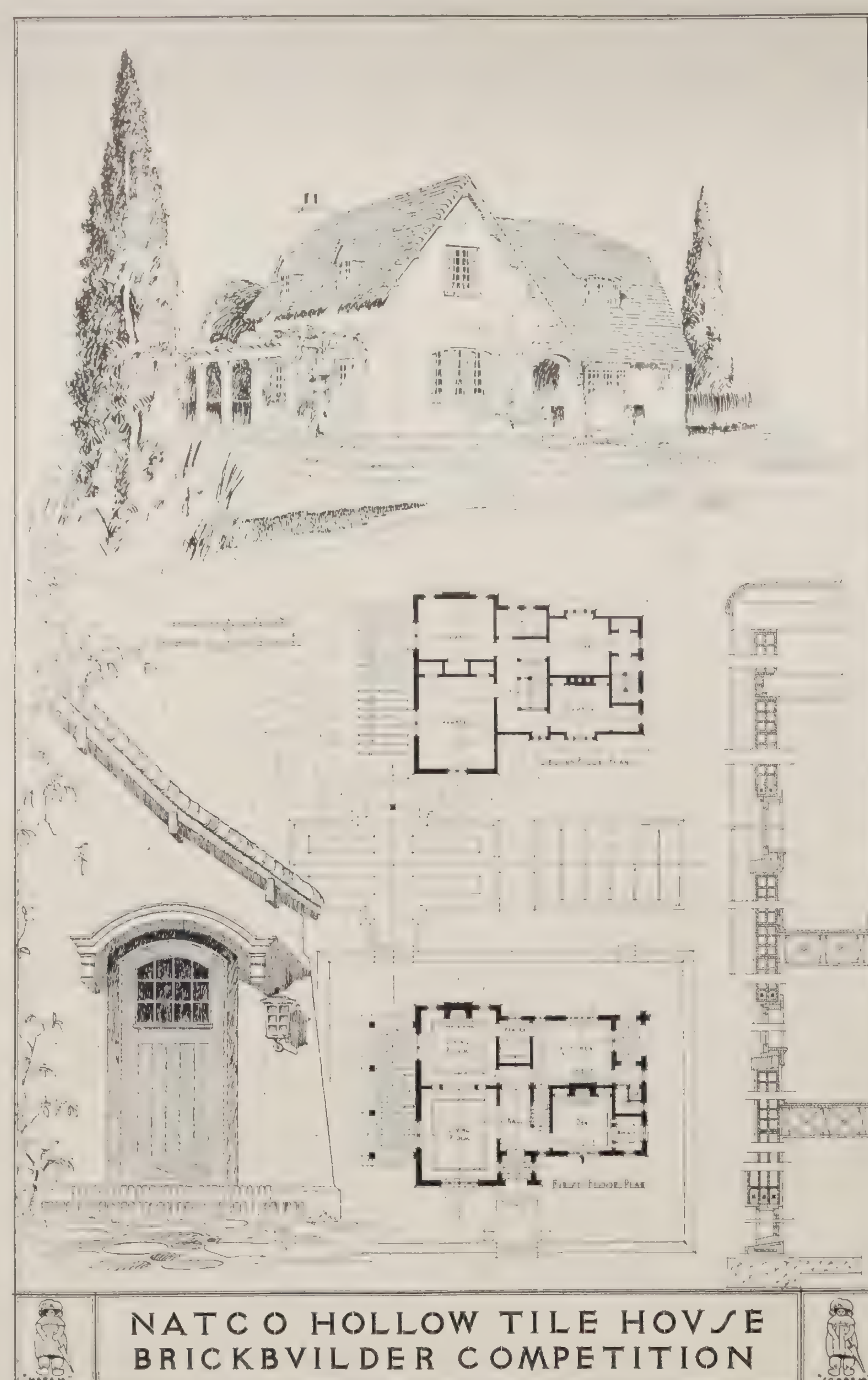
Equal Honorable Mention has been awarded to Messrs. Schneider, Weihe, Keefer, Hazen, Roberts & Hallaren, and Aegerter, whose designs present a number of pleasing suggestions ranging from the highly picturesque to the strictly formal. The majority of these designs lean, perhaps too much, toward the picturesque; and it is regretted by the jury that there have not been more designs presented which would express the simple dignity which could so excellently have resulted from a logical and straightforward use of the material specified.

BENNO JANSSEN, Pittsburgh (Janssen & Abbott).
HARRIE T. LINDEBERG, New York (Albro & Lindeberg).
MILTON B. MEDARY, JR., Philadelphia (Zantzinger, Borie & Medary).
ROBERT C. SPENCER, JR. (Chicago).
WILLIAM B. STRATTON, Detroit (Stratton & Baldwin).

Jury of Award.

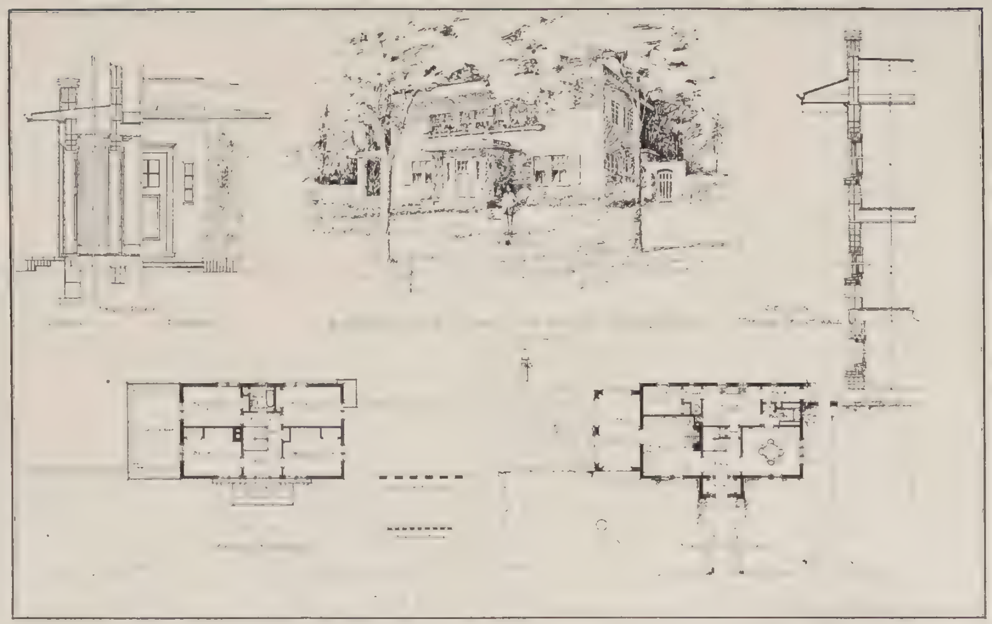


FIRST PRIZE DESIGN.
Submitted by Eugene L. Walter, Buffalo, N. Y.

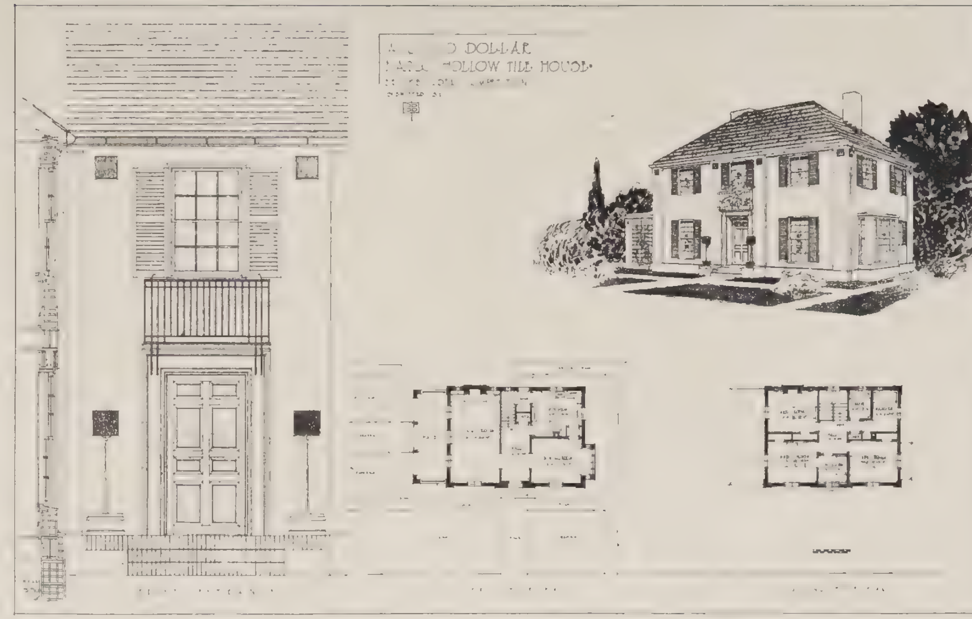


SECOND PRIZE DESIGN.
Submitted by Jack Lehti, Washington, D. C.

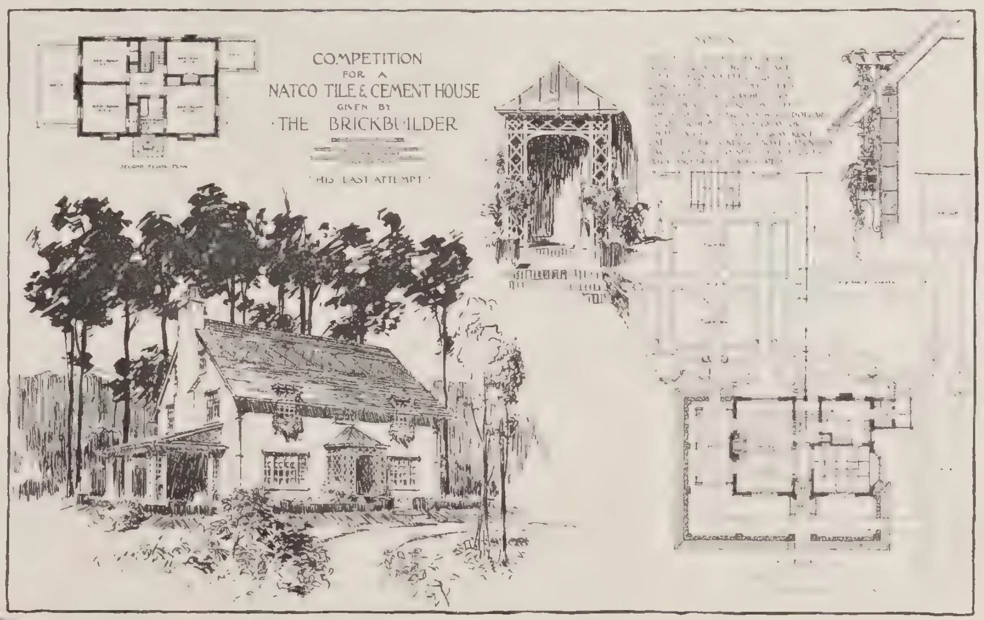
THE BRICKBUILDER COMPETITION FOR A SMALL HOUSE OF NATCO HOLLOW TILE.



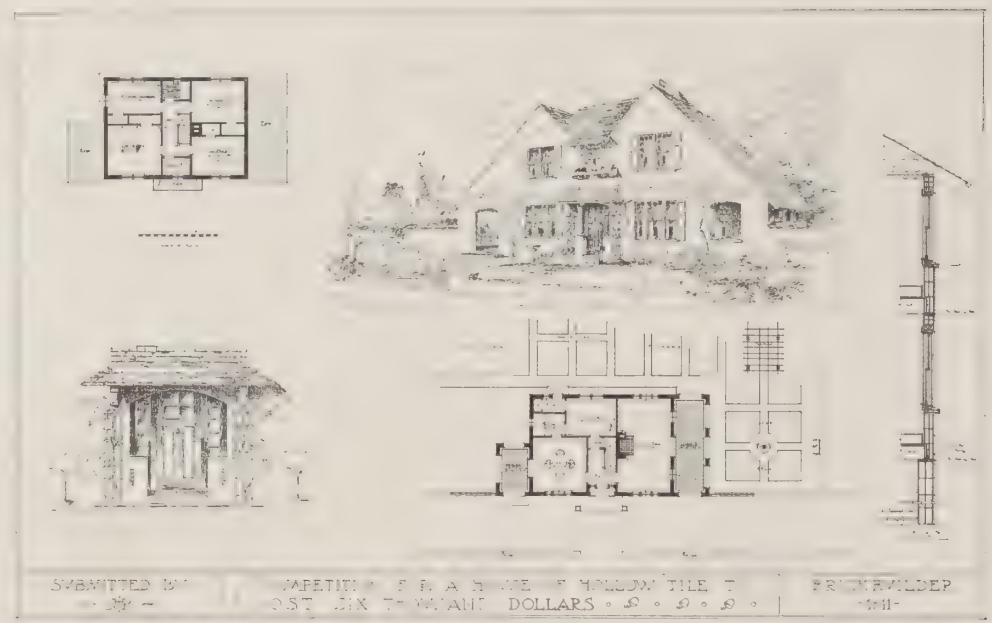
THIRD PRIZE DESIGN.
Submitted by Herbert H. Bohachek, Boston, Mass.



FOURTH PRIZE DESIGN.
Submitted by Francis D. Bulman, Boston, Mass.

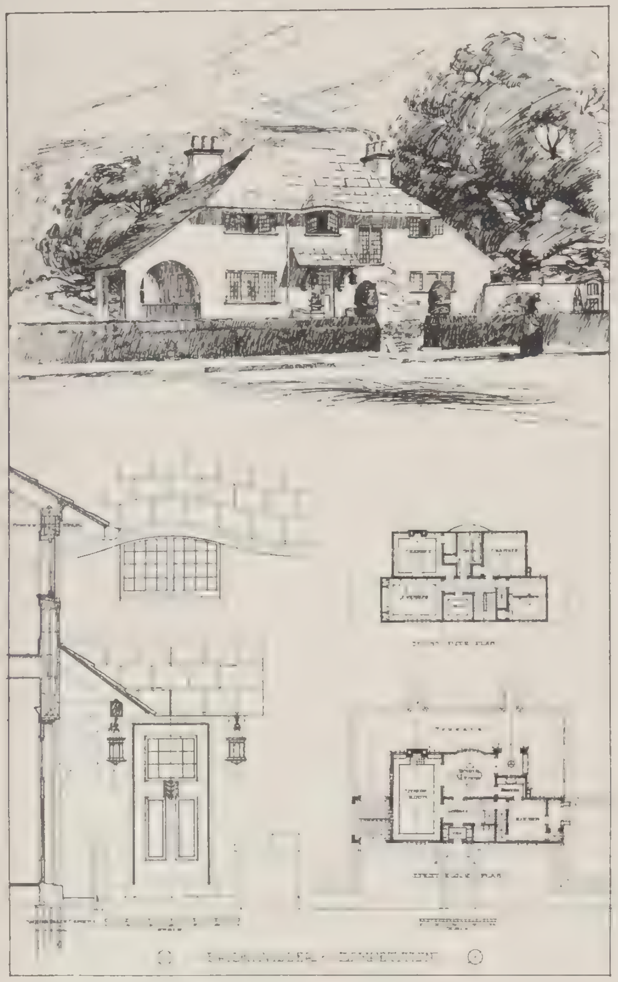


MENTION DESIGN.
Submitted by Charles Sumner Schneider, Cleveland, Ohio.



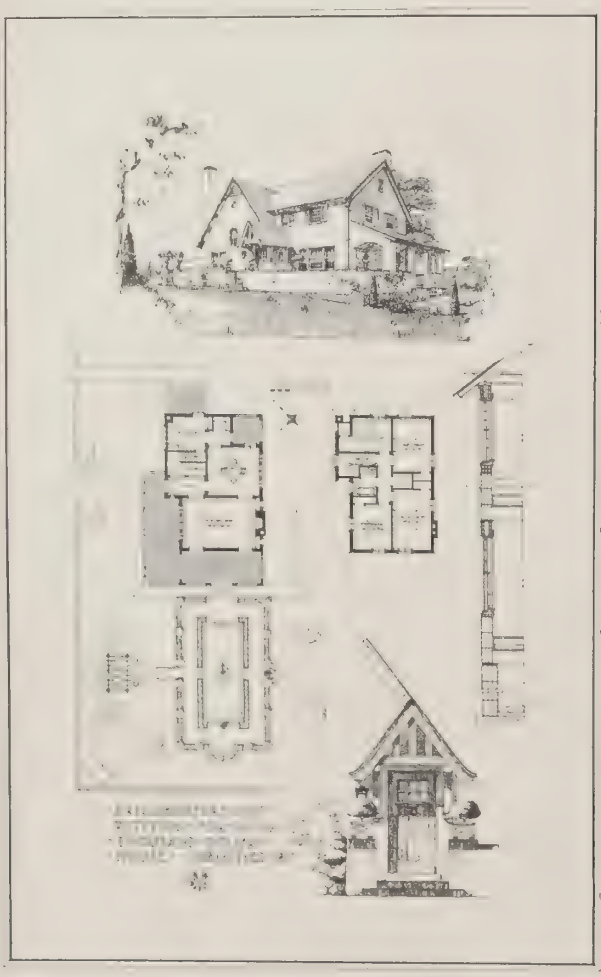
MENTION DESIGN.
Submitted by F. M. Roberts and J. E. Hallaren, Boston, Mass.

THE BRICKBUILDER COMPETITION FOR A SMALL HOUSE OF NATCO HOLLOW TILE.

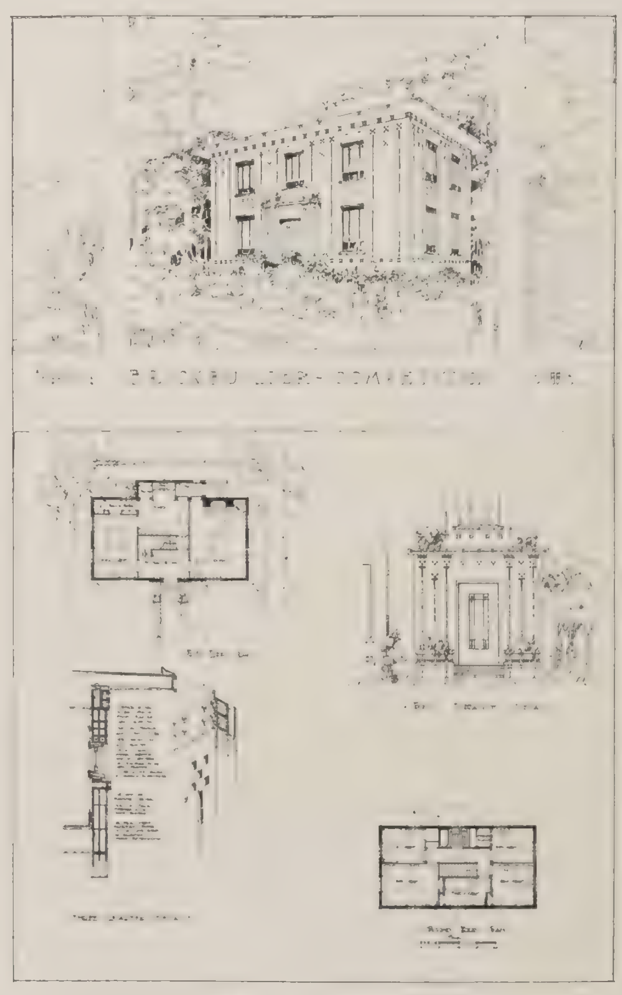


MENTION DESIGN.
Submitted by H. S. Hazen, Jr., Boston, Mass.

MENTION DESIGN.
Submitted by Gustave W. Aegerter, St. Louis, Mo.



MENTION DESIGN.
Submitted by Wm. W. Keefer, 2d, Lansdowne, Pa.



MENTION DESIGN.
Submitted by Ernest E. Weihe, San Francisco, Cal.

THE BRICKBUILDER COMPETITION FOR A SMALL HOUSE OF NATCO HOLLOW TILE.

Plate Illustrations—Description.

SCHOOL OF INDUSTRIAL ARTS, TRENTON, N. J. PLATES 85, 86. The purpose of this school is to offer free instruction in all the practical and fine arts courses. The exterior is of "Tapestry" brick with trimmings of polychrome terra cotta. The base of the building is of a local granite and the clock over the main entrance is of carved wood, gilded and colored. The auditorium will seat four hundred. The fourth floor provides for machine and architectural drawing together with class rooms and toilets; the fifth floor takes care of designing, antique, free hand, painting, life-class, storage and toilets. The building, which is strictly fireproof, is equipped with a steam heating plant and modern plumbing. The contents of the building are 452,000 cubic feet, estimated from the basement floor level to the top of the flat roof. The total cost was $91,000, making $.201 per cubic foot.

NORTH CHICAGO HEBREW CONGREGATION TEMPLE, CHICAGO. PLATE 87. The exterior of the temple is of a rich brown Oriental brick with slight variation in colors, and trimmings of stone. The first floor is constructed directly on the ground. Steel trusses support the wood roof joists which are protected below by a plaster ceiling suspended on expanded metal. In order that the main auditorium can be used during the daytime without artificial light, large windows are provided with semi-translucent glass The electric lighting is entirely concealed by placing the lights back of the projecting cornice, from where they are reflected downward by the curved ceiling. The seating capacity, including the balcony, is twelve hundred. The interior decoration consists of panels outlined with flat bands, tinted throughout in tan and ecru colors. The building adjoining has an assembly room on the first floor which seats three hundred and fifty, while the second floor is devoted to school purposes. The ground to the left of the auditorium will be treated as a sunken garden. The cubage estimated from the footings is 618,000 feet for both buildings. The total cost including the organ and architect's fee was $80,000, making the cost per cubic foot approximately 13 cents.

CLUB HOUSE, PITTSBURGH ATHLETIC ASSOCIATION, PITTSBURG. PLATES 88-92. The exterior of the building is of terra cotta and has for its prototype in design the Palazzo Sanmicheli, Venice. In order to avoid unusual story heights and large window treatments the swimming pool, gymnasium and squash courts have been placed in the center of the building. The women's department is independent of the rest of the building, while the entrances to the swimming pool and gymnasium are so arranged as to be entirely closed off from the men. The dressing rooms are arranged in groups of three with a lavatory in the center. The large lobby is entirely finished in pink Tennessee marble; the dining room is covered from floor to ceiling with landscape decoration; the grill room is paneled in finished oak throughout; and the billiard room has a latticed effect on the walls and cork tiling on the floor. The swimming pool, which is 25 feet by 75 feet, is finished in green and white terra cotta. The special features are the scum gutters which run around the pool at different levels, the curb which protects spectators from being splashed, and the rubber flooring at the ends. The pool is supported on steel columns which rest on piers that extend to solid rock 14 feet below the cellar level. The tank itself is constructed of boiler iron, inside of which are consecutive layers of concrete 6 inches thick, lead with a total weight of twenty-two tons, concrete 3 inches thick, and white tile bricks 3 inches thick. The gymnasium, 48 feet by 96 feet, has a permanent stage at one end and two galleries, one for pulley weights, etc., the other for the running track which is covered with cork. The roof of the gymnasium is flat and tiled for outdoor games. Three floors accommodate fifty-nine bedrooms, so arranged as to be used with or without baths, en suite or separate. The cost of the building was approximately $700,000.

Editorial Comment and Miscellany.

ACOUSTICS.

MR. H. H. STATHAM, writing on the subject of "Buildings for Music" in *The Architects' and Builders' Journal* says: "Acoustic effect is a most elusive problem; buildings which ought not, theoretically, to be good for sound sometimes proving unexpectedly satisfactory, while those over which great pains have been taken turn out failures. But one general principle is undeniable: it should be the object of a concert-room to assist sound at its point of production, and to prevent any reflection or reduplication of it by echo when it has once been produced. In the construction of the orchestra and its surroundings nothing is so suitable as wood. Hard substances on the walls will drive sound forward, but will give it a harsh clanging effect. Textiles, on the other hand, drink up sound without vibrating with it; there should therefore be no curtains or such things anywhere about the orchestra. In the auditorium they may sometimes be useful in choking an echo, but this is only when the building is wrong to begin with. Fibrous plaster is a good material for lining the walls of the auditorium; it acts in sympathy with sound without producing much echo. As a general rule, all

DETAIL FOR THEATER.
Executed by Conkling-Armstrong Terra Cotta Company.
Albert Kahn, Architect.

THE BRADLEY MEMORIAL FOUNTAIN, CAMBRIDGE, MASS.
McKim, Mead & White, Architects.

substances which give sharp reflections of light will give sharp reflections of sound; polished marble and other such materials are therefore misplaced in a concert-room. Plate glass windows are equally bad; they send sharp echoes back; windows should be broken up into small panes with wooden bars. Then shape has to be considered as well as material. As a general rule, concave surfaces are bad, either in plan or section; they tend to focus echo. The two best rooms I can remember for hearing music were the old Exeter Hall, a wide parallelogram with the seats going up in a slope from front to back (the plan adopted also by Wagner in his Bayreuth theatre), and the Liverpool Philharmonic Hall, also a parallelogram, with a flat floor, and a flat ceiling with a cant at the walls, and the surface broken up by a cross rib pattern in relief. . . ."

A DRUG STORE AT DETROIT.
Baxter & O'Dell, Architects.

ANCIENT ROME.

AN EXHIBITION has just been opened in one of the vaults of the Baths of Diocletian, consisting of a reconstruction of Rome in the time of Constantine, about A.D. 330. The model, executed in white plaster, is about ten yards in length and six in width, and shows the various buildings of the ancient city on a scale which makes them easily recognizable. The work is that of M. Bigot, formerly a pensionnaire of the French Academy in Rome, who has spent eight years in compiling the data and finishing the plans. The area of the city represented is from a little north of the Porta Flamina, now the Porta del Popolo, to a little south of the tomb of Cecilia Metella on the Appian way, and from the right bank of the Tiber to the line of the old Servian Wall.

DETAIL BY BARNETT, HAYNES & BARNETT, ARCHITECTS.
Executed by American Terra Cotta Company.

THE EXPANSION OF THE CITY PLANNING MOVEMENT.

NOT the least of the educational value of the recent City Planning Exhibition at Philadelphia was the interesting and valuable series of half-hour talks given every day in the Mayor's Reception Room in the City Hall by experts on city planning subjects. These talks were nearly all of them illustrated by lantern slides, and all were well attended by audiences composed of men and women interested in the respective subjects and by a large proportion of persons who were in the building for the purpose of viewing the Exhibition and who were attracted by the posters and circulars announcing the lectures. So well conducted was the instructional campaign in connection with this Exhibition that it was

a common occurrence for bodies of business men, improvement associations, graduating classes, and many other organizations and collections of individuals to be shown through the Exhibition and have its significance in one way or another applicable to themselves pointed out by competent authorities.

DETAILS, BUILDING FOR THE PITTSBURGH ATHLETIC ASSOCIATION.
Executed in terra cotta by the Atlantic Terra Cotta Company.
Janssen & Abbott, Architects.

GREEK TEMPLE UNEARTHED IN CORFU.

DURING recent excavations on the site of the ancient city of Corcyra the ruins of a temple together with its sculptures were unearthed. Complete drawings have been made of the pediment of the temple, which has been ascribed to Apollo, as well as of the statuary, which apparently belongs to the Western pediment. The work will be continued under the supervision of Dr. Dorpfeld, who has already met with such great success.

UNIVERSITY CHAIR FOR FRENCH ARCHITECT.

THE Directors of Washington University, St. Louis, announce the appointment of M. Charles Abella of Paris, France, as Professor of Design in the School of Architecture. M. Abella is a graduate of l'École des Beaux Arts, was "logiste" three times and in 1907 secured the first second Grand Prix de Rome. As a practitioner he won the competitions for the "Hotel de Ville d'Essones" and the "Home for the Insane." For several years he has been associated with M. Bernier in the work of the Atelier Bernier. M. Abella will assume his duties at Washington University in September 1911, and will take direct charge of the work of intermediate and advance design.

DETAIL BY SEYMOUR AND PAUL DAVIS, ARCHITECTS.
Executed by the O. W. Ketcham Terra Cotta Works.

MISSION CITY AT PANAMA—CALIFORNIA EXPOSITION.

WORK will soon be started on the Mission City in Balboa Park for the Panama-California Exposition, designs for which have been prepared by Bertram G. Goodhue, architect. The buildings will be completed as rapidly as possible in order to give ample time for the remainder of the exposition work. The Mission City will be one of the salient features of the exposition and will follow in amplified form the architecture which the "padres" of early California used for their edifices.

THE PEOPLES GAS BUILDING, MICHIGAN AVE., CHICAGO.
At the right is the Municipal Courts Building faced with white enameled terra cotta. At the left the Pullman Building, now 30 years old, with trim of red terra cotta. The architectural terra cotta used in the three buildings was furnished by the Northwestern Terra Cotta Company.
D. H. Burnham & Co., Architects.

ARNOLD W. BRUNNER, President of the New York Society of Architects, is traveling abroad in quest of ideas to incorporate in the new building for the State Department at Washington. Mr. Brunner is planning to have not only a large conference room, in which international meetings may be held, but also a monumental hall for state banquets. This is an entirely new departure, as hitherto America's foreign visitors have had to be entertained at hotels, etc.

THE Emperor of Germany has decided that the statue of General von Steuben, the German hero of the American revolution, which the United States Congress has presented to Germany, shall be erected at Potsdam. It has been found necessary to reconstruct the garden selected and to remove a marble fountain in order to give the Steuben memorial a place befitting its monumental character.

THE foundations of the Bank of England, London, are being repaired on account of a slight subsidence. The original piles on which the bank has stood for nearly two hundred years are in an exceptionally good state of preservation. During the excavations considerable Roman pottery ware has been unearthed.

DETAIL BY HARRY HOWELL, ARCHITECT.
Executed by the New Jersey Terra Cotta Company.

THE administrators of Tulane University, New Orleans, having decided to remove the H. Sophie Newcomb Memorial College to another site, and to erect a group of buildings for its accommodation, have appointed a committee to select an architect for the purpose. A program of competition, approved by the American Institute of Architects, has been prepared, and Prof. Warren P. Laird of the University of Pennsylvania has been selected as professional adviser. The terms of this program are exceedingly liberal, and it is expected to secure the interest of the most prominent architects of the country on account of the large amount of work to be done and the exceptional architectural opportunity afforded.

All architects interested in this competition can secure a preliminary announcement by addressing the request to the President of Tulane University, in which will be stated the terms under which this competition will be undertaken.

TELEPHONE BUILDING, CINCINNATI, OHIO.
Roofed with American "S" tile.
Hake & Kuck, Architects.

IN GENERAL.

William DeForest Crowell has been admitted to the firm of Mauran & Russell, architects, St. Louis. The new style of the firm is Mauran, Russell & Crowell.

Cary Selden Rodman, of the firm of Butler & Rodman, architects, New York, died on the 12th of June.

Harvard University has established a Department of Landscape Architecture.

DETAIL OF BUILDING, 150 FIFTH AVE., NEW YORK.
Work executed by the New York Architectural Terra Cotta Company.
Milton See & Son, Architects.

The Cleveland Architectural Club at its annual meeting elected the following officers: President, William R. Powell; Vice-President, Albert E. Skeel; Treasurer, William A. Bohnard; Secretary, L. Fewsmith, Jr.

W. L. Menzies, architect, has opened an office at 23½ S. Western avenue, Oklahoma City. Manufacturers' catalogues desired.

The Atlantic Terra Cotta Company furnished the architectural terra cotta for the School of Industrial Arts, Trenton, and the Pittsburgh Athletic Association Building, at Pittsburg. Both of these buildings are illustrated in the Plate Forms of this number.

Fiske's "Tapestry" brick was used in the School of Industrial Arts at Trenton.

The following named manufacturers of burned-clay supplied their materials for the new Chicago and Northwestern Station, which is illustrated in this issue: American Terra Cotta & Ceramic Co.; National Fire Proofing Company; R. Guastavino Co.; Grueby Faience & Tile Co.

FACTORY BUILDING, CLEVELAND, OHIO.
J. Milton Dyer, Architect.

HOUSE, LINDELL BOULEVARD, ST. LOUIS, MO.
Brick manufactured by the Hydraulic-Press Brick Company.
Mauran & Russell, Architects.

The Superintendent of Building and Grounds for the University of Chicago desires manufacturers' catalogues pertaining to the various branches of work which come under his department.

A very interesting review of work recently executed by the Atlantic Terra Cotta Company has just been issued by them in brochure form.

The memorial to Queen Victoria, just unveiled, was designed by Sir Astor Webb.

THE BRICKBUILDER

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ADVERTISING

Advertisers are classified and arranged in the following order:

Advertisements will be printed on cover pages only.

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FROM WORK BY

ALBRO & LINDEBERG; BRAINERD & LEEDS; FRANK MILES DAY & BROTHER; FROST & GRANGER; H. E. HEWITT AND HEWITT & EMERSON; CLARENCE H. JOHNSTON; R. E. MITCHELL AND WOOD, DONN & DEMING; NEWHALL & BLEVINS; JOSEPH EVANS SPERRY; ARTHUR TRUSCOTT AND ARNOLD H. MOSES.

LETTERPRESS

CHURCH OF SANTA CLARA,
QUERETARA, MEXICO.

Polychrome tile decoration on dome and lantern composed of white, blue and yellow colors — of intricate pattern.

Working Plants for Young Men's Christian Associations.

BY WALTER MABIE WOOD.

General Secretary, The Y. M. C. A. of Philadelphia.

PROBABLY no other class of semi-public buildings presents to the architect such an imperative demand for the blending of special types of institutional equipment into a composite unity as do buildings of Young Men's Christian Associations.

Practically all the essential elements of a hotel, a social club, a school, a church and an athletic club with separate provision for boys and men are to be brought into a harmonious combination that while preserving the efficiency of each feature shall so interrelate them that a man's use of one shall lead him into the use of all.

In recent years, with the rapid addition of new features and the employment of an increasing number of special supervisors for different phases of work, many Associations have developed buildings that are more conspicuous for their segregation of so-called "departments" than for their contribution to the attractiveness and effectiveness of the combination as a whole.

SOME FUNDAMENTALS.

There are certain fundamental principles that must be wrought into the plans of a modern Association building.

1st. *It must be inviting, convenient and comfortable.*

The Association is a leisure-hour institution to which men and boys feel no obligation to come unless attracted by the fellowship and activities of the place. If the building of the Association be uninviting or ill suited to its intended activities, the Association will lose its constituency to competing leisure-hour attractions of less helpful influence.

The good purposes and beneficial service of the Association do not relieve it from the necessity of presenting to possible users a most attractive exterior and interior.

While there is no call for extravagance, and certainly not for gaudiness, the character and tone of architectural finish and furnishings should bespeak the brighter and higher ideals and bear as far as possible the marks of simple elegance. To such the cultivated are attracted and the uncultivated are not without appreciation of them also. The high grade, not the cheap Association building furnishes the one common attraction to rich and poor, cultivated and uncultivated alike.

2d. *It must have considerable revenue-producing capacity.*

It is the common purpose of Young Men's Christian Associations to keep down to the minimum the cost of the privileges to members so as to make them accessible to the maximum number, then too much of the religious, social and service work of the Association involves a net expense. It is therefore necessary, in order to avoid the strain and hazard of depending largely upon contributions to cover the difference between the dues and fees and the cost of operation, to put portions of the Association building to such uses as shall produce a revenue.

Formerly the lower portions of buildings were arranged for stores, etc., with the Association activities provided for upstairs. The past decade has shown the superior advantages of dormitories or living rooms for men occupying the upper portion of the building and putting the other general activities down nearer to or on the street level. These dormitories return a larger and less fluctuating revenue while at the same time rendering a real service to young men and aid in giving a home-like rather than a public institutional aspect to the building.

Several common faults are the selection of a site where dormitories are not in demand, the provision of too small a number of dormitory rooms, the arrangement of too many large rooms for two or more occupants with too few comparatively small rooms for one occupant only at small rental, and the failure to anticipate additions to the dormitory section as the demand increases.

In addition to this dormitory source of revenue to supplement the receipts from dues and fees, each of the other features should be so arranged that its use can be economically controlled and proper fees for its use collected. For instance, instead of one door admitting to gymnasium, natatorium, lockers, baths, games, etc., each feature should be capable of such control as would admit to its use those who may have purchased special privileges separately *à la carte* or instead of restricting the sale of privileges to those who are willing and able to purchase the whole combination on an annual basis.

Another consideration is the arrangement of class, club and other rooms, so that when not used for their major purposes they may be converted to living rooms or other revenue-producing uses.

3d. *It must be capable of economical maintenance and control.*

An Association is used day and night for varied purposes by a considerable number of people and consequently must be able to stand rather hard usage. It is also true that the fees charged users are always scaled lower than the cost of operation.

These two facts make it necessary to so plan and construct the building that a minimum current expense shall be incurred in repairs and maintenance, in janitor service and in supervisory force for the proper control of activities.

It is much easier to secure enough money to construct a new building properly than it is to get current subscriptions to meet excessive expenses for up-keep. Architects, building committees and others should not readily consent to initial economies which involve abnormal maintenance and operation charges.

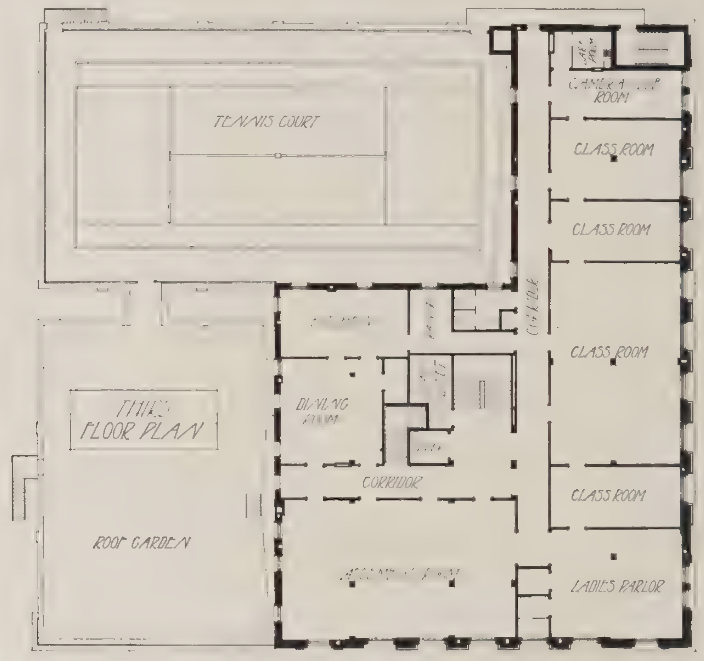
Effective design, good materials and good workmanship are even more needed in an Association building than in a store, factory or other building which houses a self-supporting enterprise.

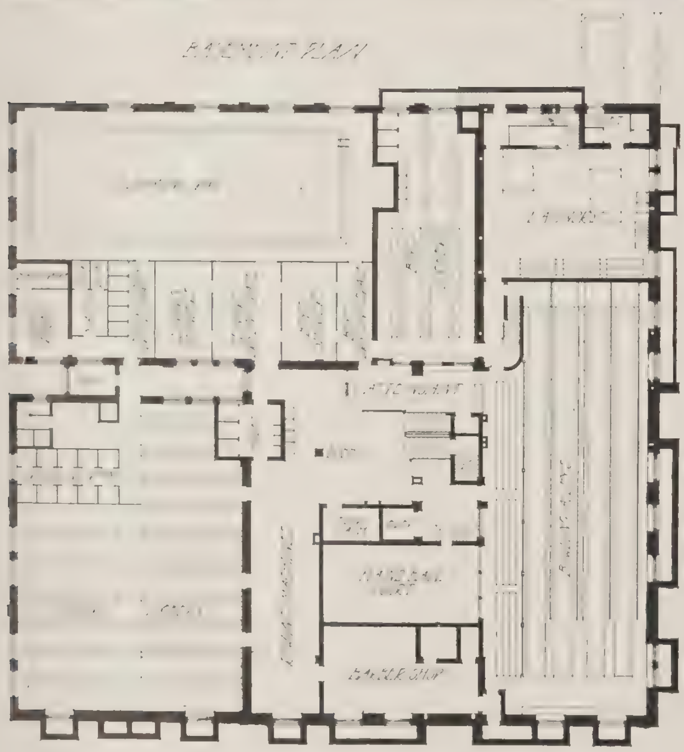
In planning the arrangement of features three test questions should be constantly applied: (A) Does this arrangement involve minimum travel of people in the building, especially elevator travel? (B) Does this

arrangement avoid opening up more than the minimum space actually required for the feature in operation at the time? (C) Does this arrangement enable a minimum force to give efficient supervision of the space in use?

In arranging things for effective handling by a minimum force there will be found considerable economy in concentrating all department executive offices as nearly as possible beside each other on the main floor adjoining the lobby. The scattering of offices for the various department directors over the building as at present arranged in many buildings entails excessive office expense for attendants or many useless trips of members and others to closed offices. The gathering to one controlling center of all offices also simplifies the matter of clerical service and executive supervision. When directors have occasion to be in other parts of the building they should be among the members and not attempt to do office work and lead activities at the same time.

4th. *It must be so designed and constructed as to facilitate internal remodeling and rearrangement of rooms for changing uses, also the attachment of additions or annexes.*





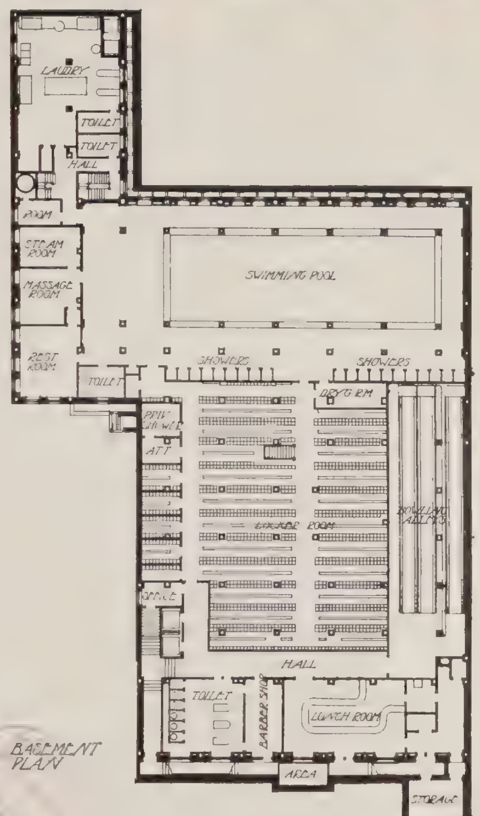
YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, RICHMOND, VA.
Davis & Davis, Architects.

The variety of features conducted by an Association, the changing popular demand and the intent of the Association to supplement rather than supplant or duplicate other successful agencies serving men and boys, makes it expedient that the adaptation of the work to current needs may not be hampered by fixity of the building arrangement and equipment.

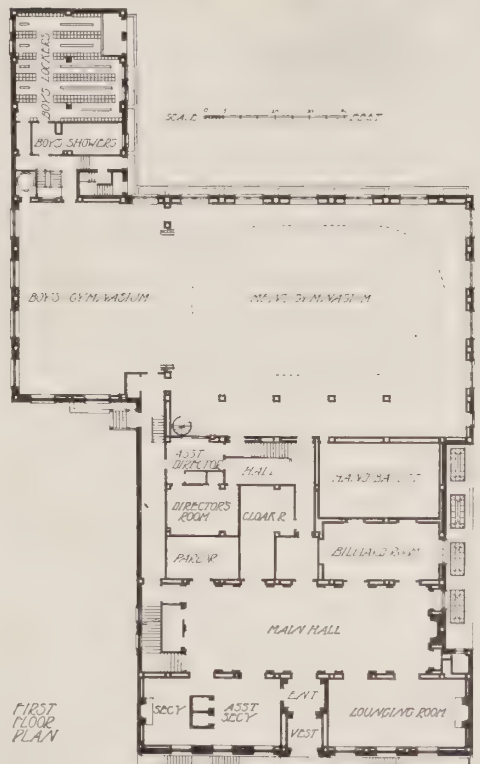
LIBRARY.

MAIN FACADE.

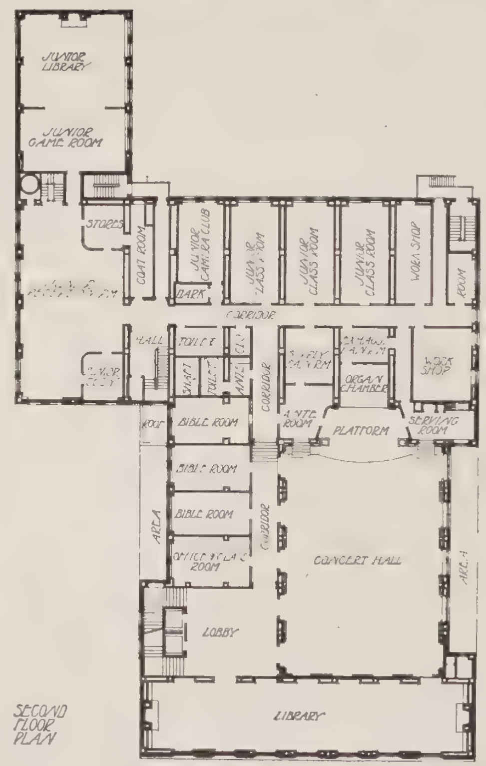
ASSOCIATION HALL.



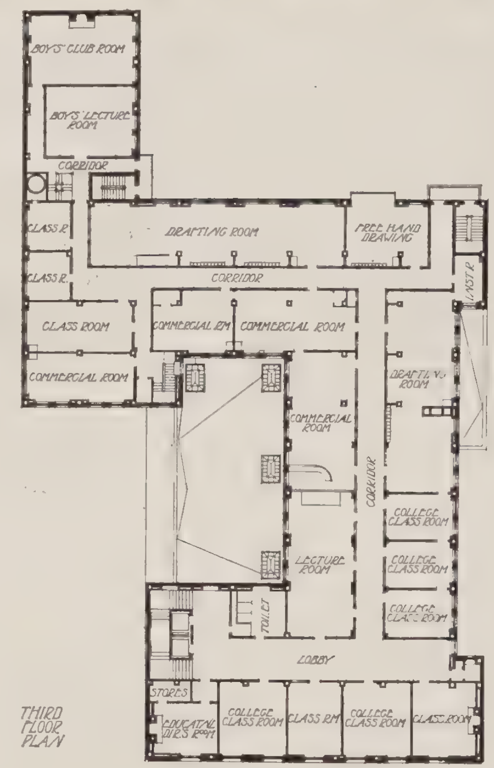
BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN



THIRD FLOOR PLAN

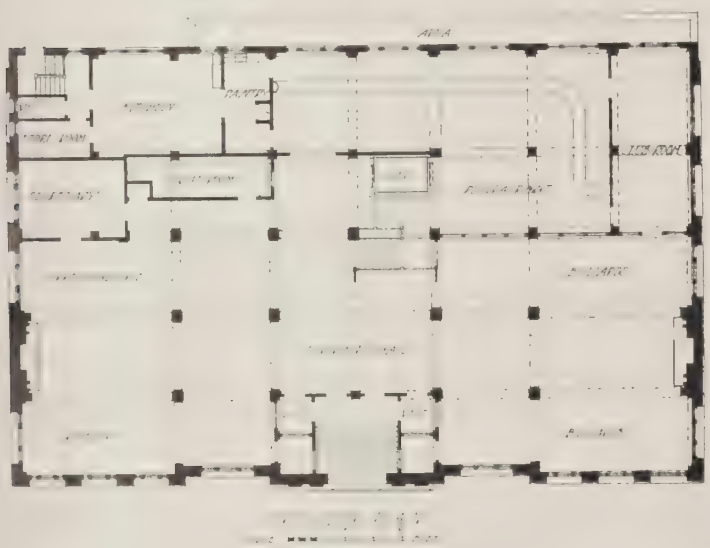
THE NEW CENTRAL YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, PHILADELPHIA, PA.
Horace Trumbauer, Architect.

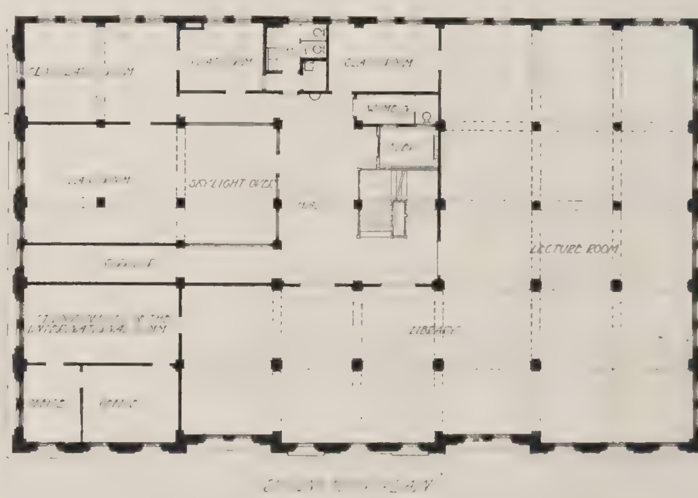
Not only the service rendered but the financial safety of the Association depends largely upon its freedom to reshape its work to new ideals and demands.

Some building plans are meritorious not because the original arrangement is final but because they permit of changes without too great expense and without leaving conspicuous marks of alteration.

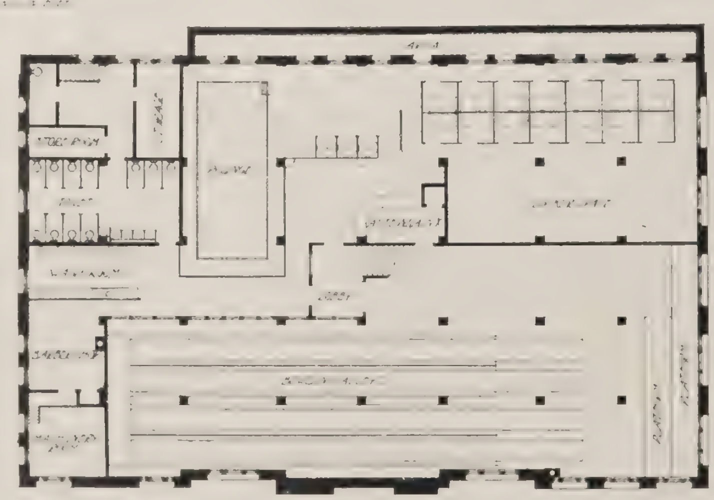
Any successful Association is a growing institution and will need changing and enlarging equipment for various phases of its work, and while passing judgment on the fitness of the plans for present uses the architect, and especially those supervising the Association work, should constantly figure on the other possible uses to which each room might be put and how flexible the building will be for such changes.

RAILROAD BRANCH YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, ST. LOUIS, MO.
Theo. C. Link & Son, Architects.





They should also anticipate likely enlargement of the building and should make such provision in land space, foundations, strength of walls, hallways, light courts, elevators and space for enlarging mechanical plant as will make increases in the size of the building feasible without unduly disturbing current activities and without involving unnecessary expense or destroying the architectural harmony of the building plan.



BASEMENT PLAN

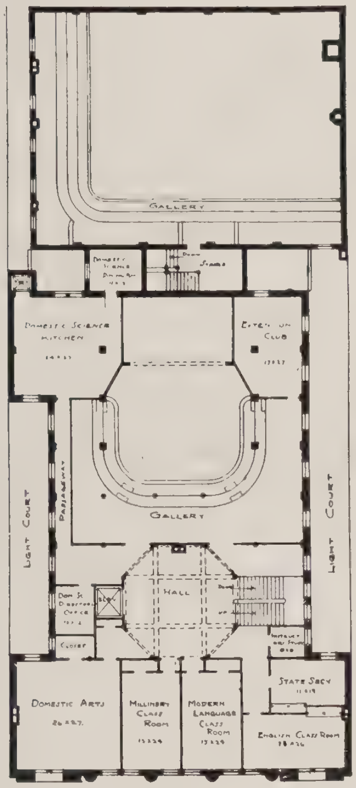
Since Association experience has shown that many buildings are outgrown in a comparatively few years and many others must be abandoned because of necessary removal to new community centers, it is well worth keeping in mind from the outset the possibility of transforming the building to adapt it to other than Association uses, thus avoiding an unnecessary shrinkage in value of the property when the Association leaves it.

SUGGESTIONS FROM EXPERIENCE.

The following suggestions growing out of personal experience in making needed changes and additions in Association buildings bear upon matters which are frequently not properly provided for and should have the attention of architects and building committees when plans are being prepared:

Barber Shop. Ample space should be provided for those waiting for service, the line of traffic being sufficiently clear of the barbers' chairs not to involve interference with the barbers.

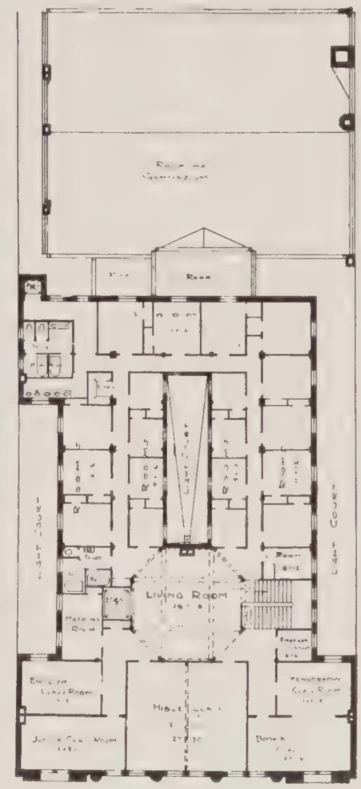
Baths and Lavatories. Specially liberal provision



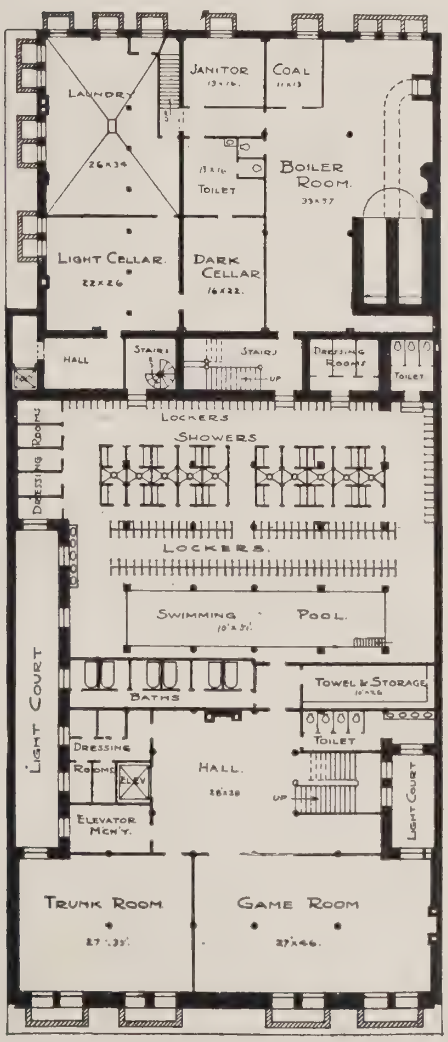
THIRD FLOOR.

YOUNG WOMEN'S CHRISTIAN ASSOCIATION
BUILDING, INDIANAPOLIS, IND.

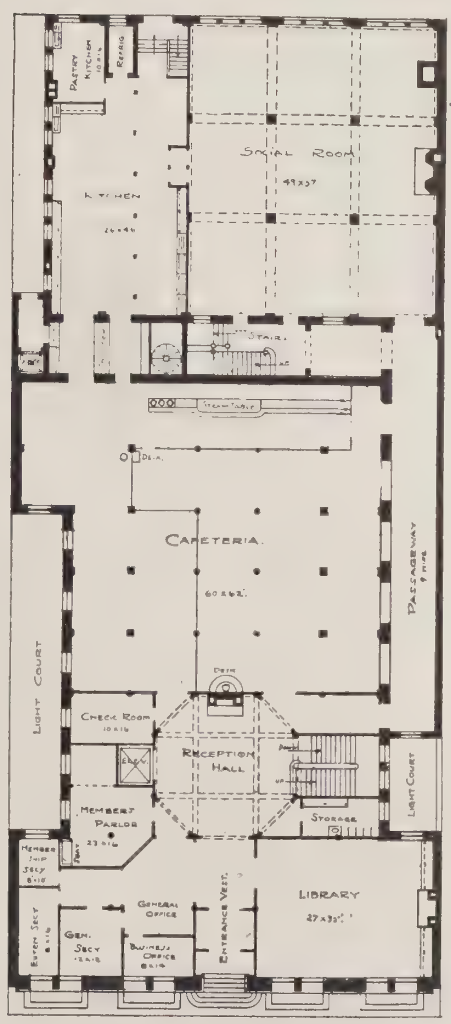
D. A. Bohlen & Son, Architects.



FOURTH FLOOR.



BASEMENT.



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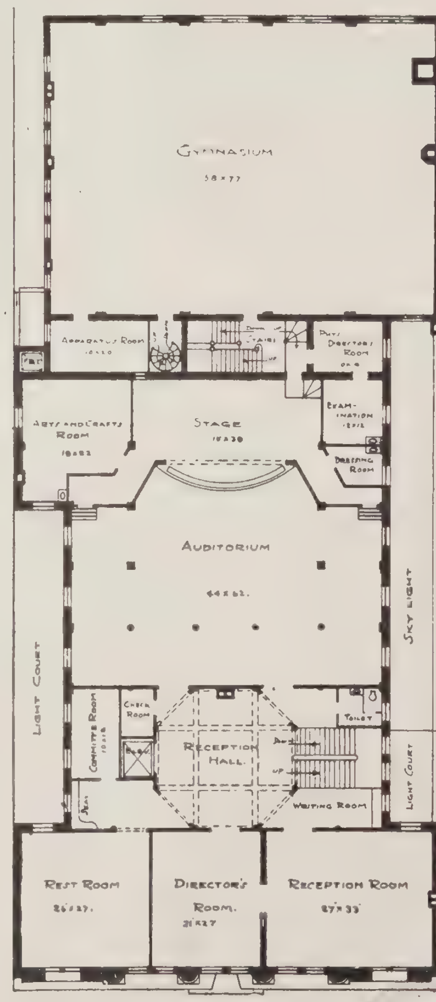
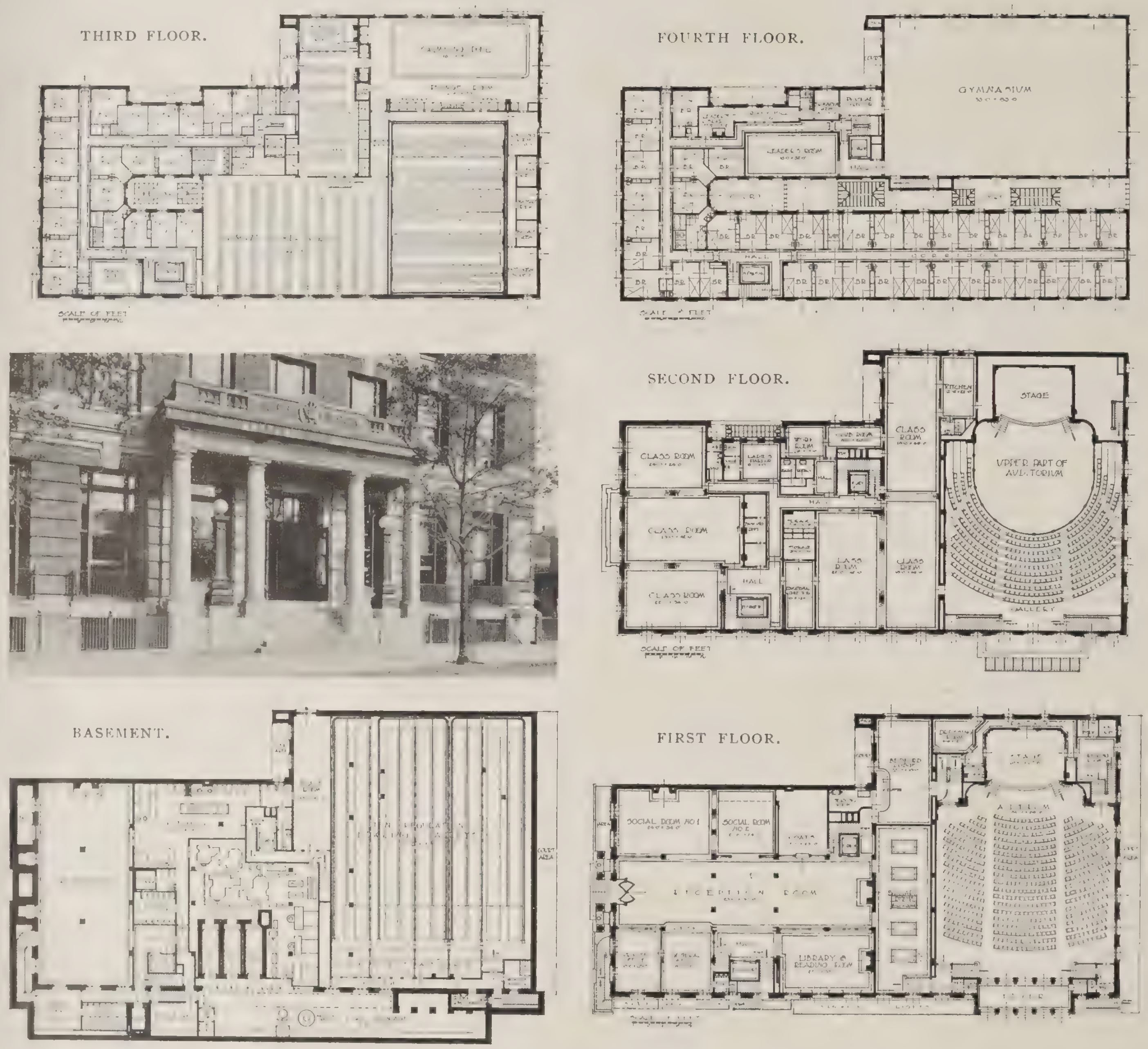


SECOND FLOOR.

should be made for heating water to care for the maximum demand for the baths. Baths should be placed in other than the natatorium room to avoid steam nuisance and to make possible the use of the natatorium for events without putting baths temporarily out of use.

Lavatories and baths should be separated from toilet rooms by double-swinging, close-fitting doors with high glass panel. Boys' baths should have several fixtures in one large stall rather than individual baths. If shower baths are arranged in two or three adjoining rooms or stalls with doors that can be locked between them, with the boys' locker room at one end of the series and the men's locker room at the other, by opening or closing proper doors the number of available baths for men and boys at definite hours may be increased or decreased at will.

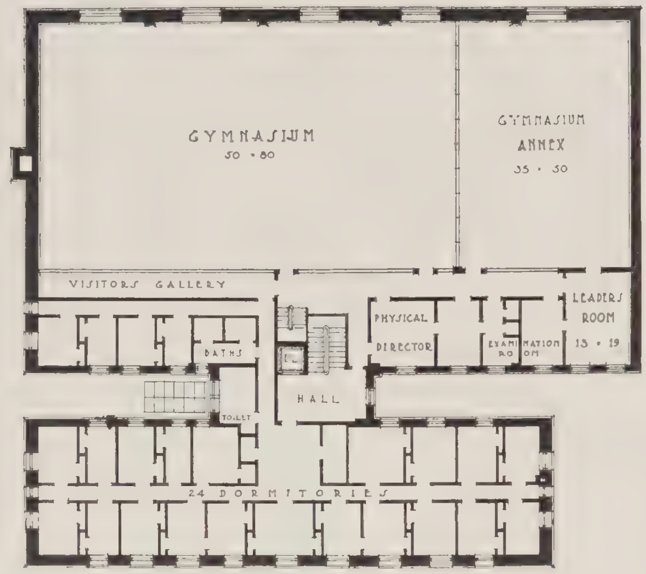


THE BEDFORD BRANCH YOUNG MEN'S CHRISTIAN ASSOCIATION, BROOKLYN, N. Y.
Jackson & Rosencrans, Architects.

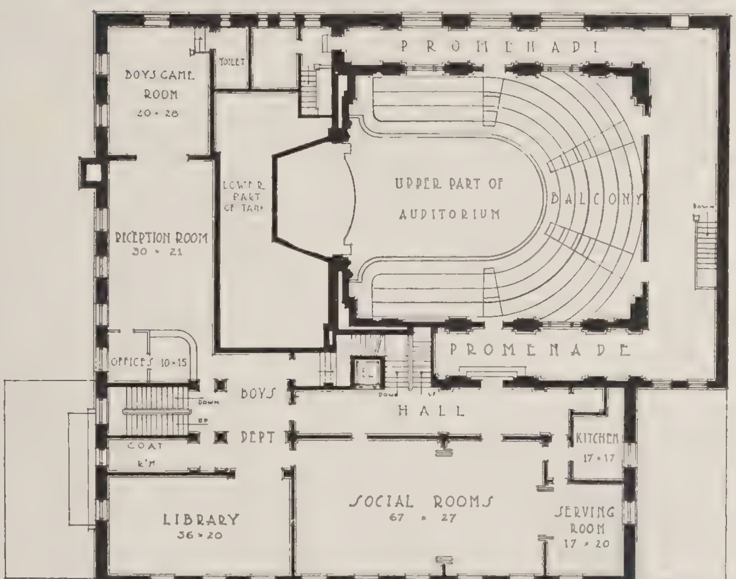
Bulletins. The design of the exterior of the building should include provision for such bulletins and announcements as are likely to be displayed. The same provision should be made in the lobby and other interior points to prevent the unsightly placing of signs and notices. Suitable racks for the holding of printed matter for distribution should be placed in the lobby near the office.

Cabinets and Cases. Usually it is unwise to build in cabinets and cases; they should rather be movable so that changes may be made without defacing the interior finish.

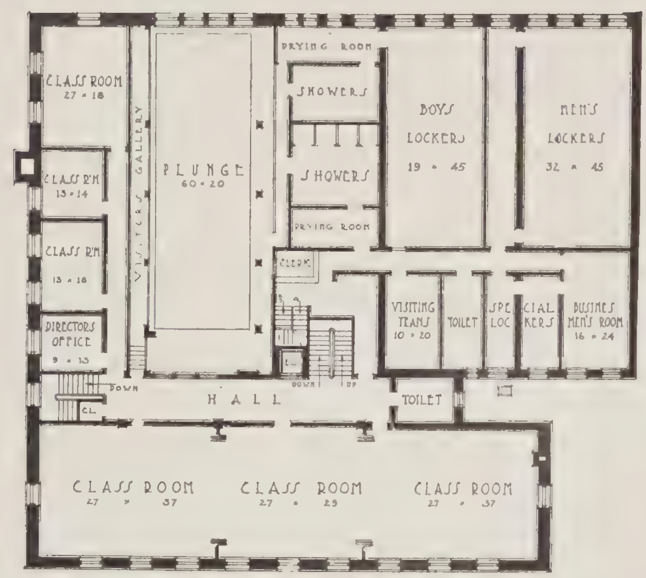
Check Room. The general check room should be larger than is usually provided and should have two separate windows to make possible the caring for two



THE FOURTH FLOOR



THE SECOND FLOOR



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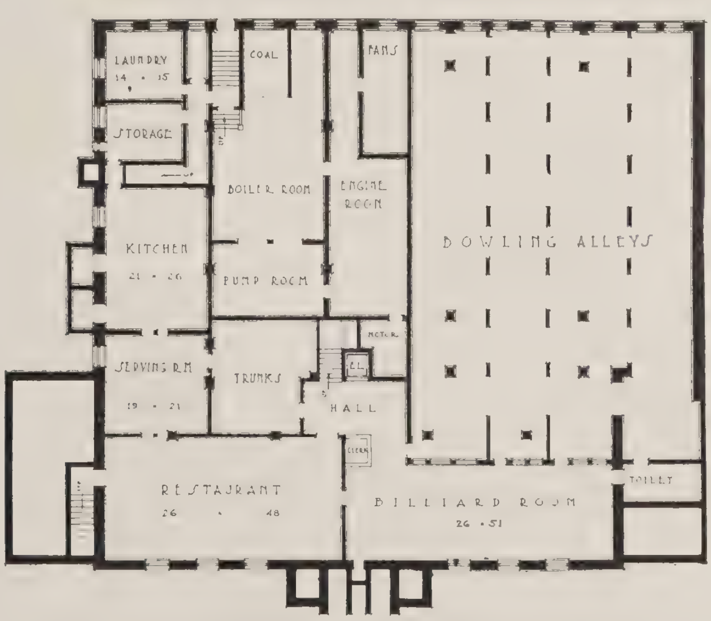
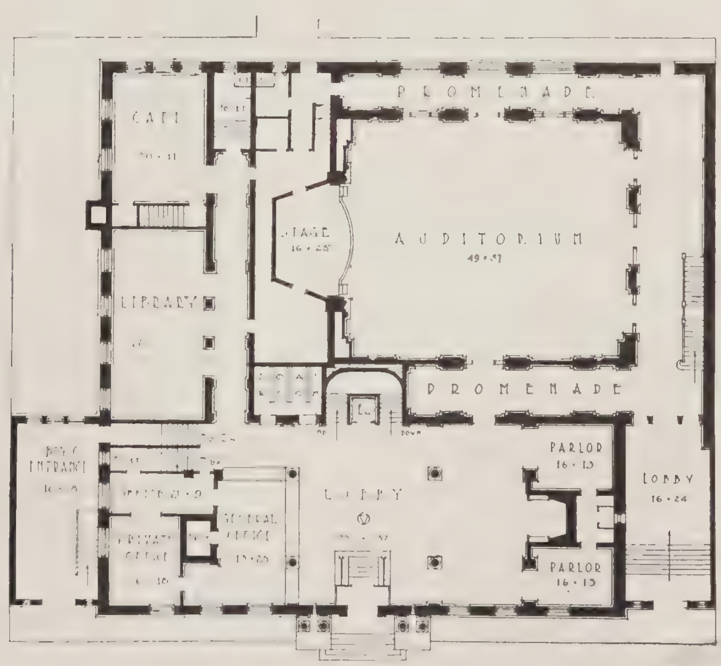


THE BASEMENT PLAN



THE FIRST FLOOR

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, CAMDEN, N. J.
Howes & Morse and J. C. Jefferis, Associated Architects.

lines of people at a time. Extra facilities for checking apparel should be provided near the main assembly hall.

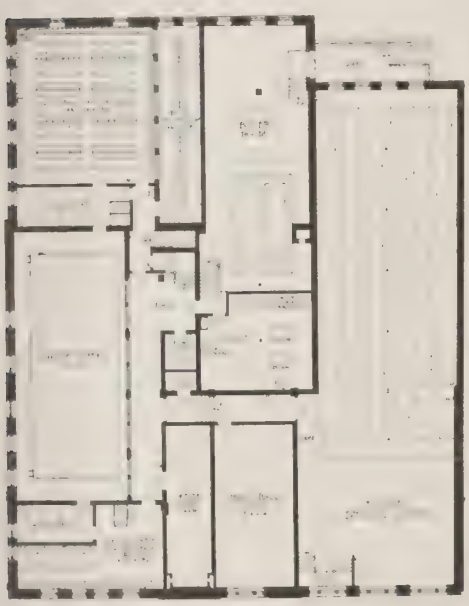
Class Rooms and Laboratories. These should be provided with ample blackboards. Class rooms should have connecting doors, preferably at point in partition wall farthest from hall doors. Several moderate sized rooms may be wisely connected with accordion doors.

Class rooms should be in portion of building not disturbed by noises from the street or gymnasium.

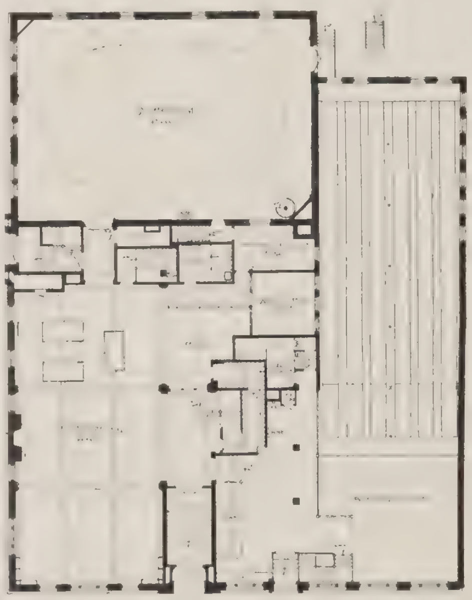
Club Rooms and Parlors. These may well be located near the lobby and the restaurant, and a small parlor for ladies, very accessible to the lobby but retired from it, should be provided.

Decorations.

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, PITTSFIELD, MASS.
Harding & Seaver, Architects.



PLAN OF BASEMENT



PLAN OF FIRST STORY

PLAN OF SECOND STORY

The flagstaff for flag or pennants should be provided together with other fastenings and fixtures for exterior and interior decorations. These should be included in the original plans to avoid later injury to woodwork and walls. Picture rails throughout the entire building and simple wall panels in numerous places facilitate decorations.

Doors. Doors to rooms in which Association activities are conducted may well be solid except for narrow clear glass panel at least 4 feet 6 inches above the floor.

Especially in the dormitories, good locks of the cylinder type, if possible, should be used.

Dormitories. With possibly few exceptions all lavatories and bath facilities for dormitory men should be concentrated in large amply equipped rooms at a central point on each floor.

No separate parlors or assembly places are advisable in the dormitory section of the building.

Drinking Water. Drinking fountains, refrigerated if possible, should be placed on each floor, or at least places should be provided for water coolers.

Electric Connections. Special openings with proper attachments should be provided for stereopticons, desk lamps, decoration lighting, fans, vacuum cleaners, etc.

Elevators. At least one should run from the basement to the roof and be large enough to take a piano. Passenger elevators should have car indicators on each floor.

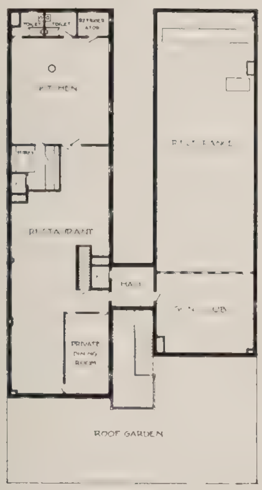
Engine Room. This should be given liberal space with careful provision for ventilation, should be accessible for the delivery of supplies and should have a building shop for repairs and light shop work adjoining it.

Entrances and Exits. The number of those leading into and out of the building should be reduced to a minimum. All except the main entrance should be equipped with alarm indicating in the office.

Special doors leading from the gymnasium and natatorium to hallways and lobby should be provided for use in handling crowds.

Two separate entrances to the building, equally attractive, are advisable, one for boys and one for men.

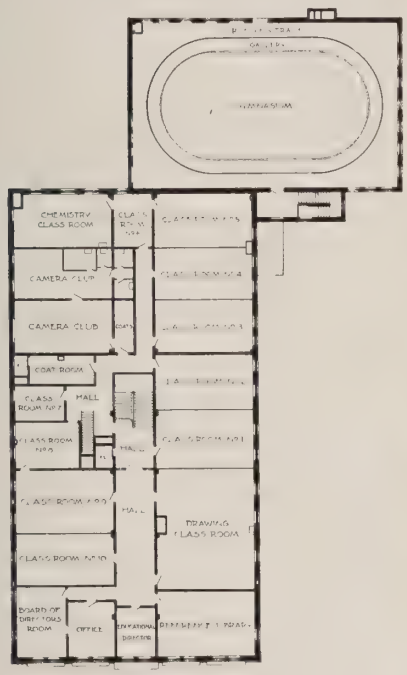
Floors. Cement floors that require painting to be



SIXTH FLOOR PLAN.

MUSIC ROOM.

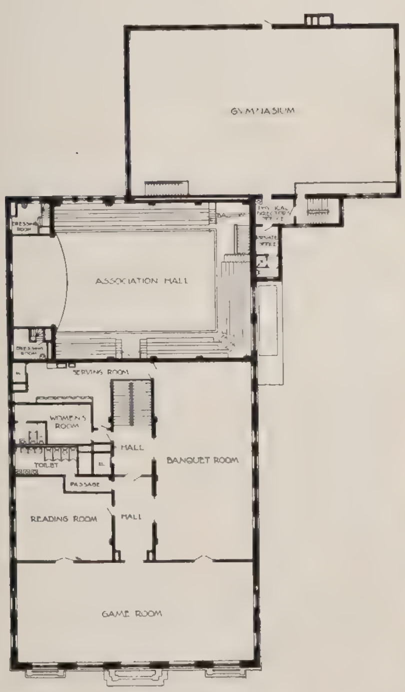
FIRST FLOOR PLAN.



THIRD FLOOR PLAN.

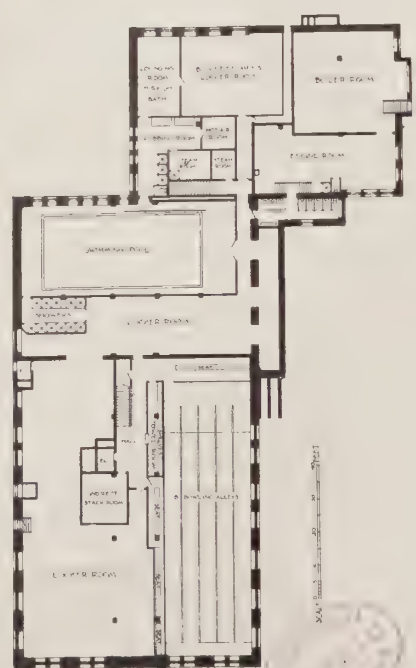
YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, SYRACUSE, N. Y.

Gaggin & Gaggin, Architects.



SECOND FLOOR PLAN.

MAIN LOBBY.



BASEMENT PLAN.

presentable should be avoided. Waxed floors are very difficult to maintain. Special care should be given to insure a proper slope of floors to drains. Construction often fails at this point even when plans are right.

GAMES. Pool and billiards may well be placed in room connecting with the bowling alleys, pins being set at the far end away from the billiard room. This arrangement enables one attendant to control both rooms. Small games should be placed in parlors and lobby, not in separate game room. In games where tournaments are held, as in equipment where athletic contests or meets are held, standard equipment and standard measurements should be used. All games should be placed where constant oversight is possible.

GYMNASIUM. If possible a portion of the gymnasium should be so that it can be opened to the sky. An auxiliary gymnasium or special exercise room, both if possible, should be provided. Windows and lights should be adequately screened.

The running track should have safety rails near enough to floor of track to prevent a party who has fallen from slipping through, but high enough from the floor to let basket balls, etc., roll through if thrown on the track. Considerable apparatus should be placed so that its use will not interfere with classes using the main portion of the floor.

HALLS FOR ASSEMBLY. The large assembly hall should have a level floor with serving room adjoining which is connected with the restaurant kitchen. Individual movable chairs are desirable. The hall is then serviceable for banquets and social events where refreshments are served. A small hall about one-fifth the capacity of the large one may well be located across the hallway. The gymnasium with its entrances should be planned to make possible its occasional use for large gatherings.

HAND BALL COURTS. These require more ventilation than is usually given. They should be located near the gymnasium and have hard wood floors.

JANITORS' QUARTERS. Dressing rooms with locker and toilet facilities should be provided for men and women porters and cleaners. Supply closets should be located in different portions of the building.

LADIES' ACCOMMODATIONS. Aside from the ladies' parlor there should be at a point accessible from the restaurant the ladies' parlor and assembly hall, a retiring room with lavatory and toilet facilities.

LIBRARY. A small work room and storage room should adjoin the library and the library shelves should be of such height as to put all books within easy eye and hand reach.

LIGHTING. If possible, the lobby should have ample daylight, preferably from the front of the building, which arrangement will make the artificial lighting at night increase the attractiveness of the building. Lighting in class and club rooms should be capable of easy rearrangement to suit different uses. The lighting throughout the building should be in small unit circuits with numerous convenient switches.

LOCKERS. Men's and boys' lockers should be separate. Special attention should be given to ventilation. A few lockers with keys should be put in a small room for use by special individuals or parties. The large sized lockers should be used whenever possible. The provision of boxes to contain each man's supplies which may be stored in pigeon holes near the porter's station and delivered to the members to take to large lockers for temporary use while in the gymnasium or natatorium is an advantageous arrangement.

NATATORIUM. Where possible a portion or all of the natatorium should be so placed that it may be opened to the sky. Partition walls or guard fence should be provided to make the use of the pool impossible without passing the attendant. Ample filtering facilities should be provided, also facilities for flushing off the surface water. The latter may be accomplished by having water flow from a perforated hand rail.

Because of requirements in competitive work, the pool should be if possible exactly 60 feet in length or a simple fractional part of 60 in addition.

OFFICE. This should give ready control of the main entrance, should be easily accessible from it, but not obtrusive in the social lobby. Proper vault, mail boxes, etc., should be provided.

PLANS. It is due the architect that he shall be furnished on beginning his work a very detailed statement of the features to be provided in the building and the carefully thought out suggestions of the Association's officers as to desirable arrangements. If the Association officers and the building committee are required to prepare this matter in advance they will be able to give the architect more intelligent and sympathetic co-operation.

In the preparation of plans the nature of furnishings to be used should be considered. Mounted copies of all plans should be preserved by the Association for reference.

PLUMBING. The hot water plumbing should be so arranged that little water need to be run to waste to secure the hot.

Special control valves should be placed on mains leading to the shower baths.

RECEIVING ROOM. A room near the rear or side entrance, if possible, should be set aside as a receiving room to which all things coming into the building will be delivered and where all things will be safely stored temporarily awaiting delivery from the building. In smaller places this may be wisely located near the office or check room.

RESTAURANT. This feature proves most attractive and successful when on or near the main floor. In such location special care must be given to ventilation to keep odors out of the rest of the building. Dumb waiter service to every floor is desirable for serving club dinners, refreshments, etc. The restaurant should preferably consist of several connecting rooms.

ROOF. If possible provision should be made here for outdoor exercise, social gatherings and lounging. A section of the roof should be reserved for cleaning and sunning rugs, draperies and bedding.

SALES ROOM. This should be equipped to handle sales of toilet, gymnasium, educational and other supplies, and should adjoin the office, check room or station of the porter who controls the locker room.

STAIRS. Hand rails should be provided; there should be frequent landings, and restrictions of width of stairs by column bases, pilasters or other obstructions should be avoided.

STORAGE. Ample and accessible storage space should be provided for supplies and equipment temporarily not in use. This should be immediately accessible from the stairway and long elevator. There should be special small storage rooms or closets opening off from the gymnasium for apparatus, and off the lobby and assembly halls for chairs and other furniture.

TELEPHONES AND CALL BELLS. Dormitory rooms should be wired for call bells with return circuit. Pay telephone stations should be put in the hall on each floor. Public telephone stations should adjoin the lobby or office. Possible extensions from an exchange or the installation of a house-telephone system should be anticipated and provision made for the placing of wires.

VISITORS' GALLERIES. The gymnasium and natatorium should have ample provision of accessible gallery space for visitors and onlookers. Similar provision, less extensive, should be made in the pool and billiard and bowling rooms.

WINDOWS. Sash windows are preferable to french windows except when intended for access to balconies or porticoes. Wire glass should be used where breakage is likely or where windows are exposed to possible fire from adjoining buildings.

It should be stimulating to an architect and a builder to know that the effective designing and right construction of a Young Men's Christian Association Building are large contributions toward the furtherance of the Association's service in the upbuilding of the boys and men of the community.

Y. M. C. A. Illustrations.

Description.

Y. M. C. A. BUILDING, NORFOLK, VA. PLATES 100, 101. The exterior is of a grayish red brick having very wide white joints, with trimmings in the lower stories of Indiana limestone and above of terra cotta. The metal work is a greenish gray. The cornice is of various shades of silver gray with panels and rosettes picked out in orange and dull red. The roof is of slag except for the roof garden, which is of vitreous tile. Upon the interior the entrance lobby has terrazzo floors with marble borders, walls and ceiling of ornamental plaster work. The woodwork throughout is of ash stained a grayish brown. The construction is fireproof and cost per cubic foot, measured from the mean of the basement floors to the mean of the roofs, 25 cents.

Y. M. C. A. BUILDING, NEWTON, MASS. PLATE 102. The exterior is of water struck brick with trimmings of buff Indiana limestone. Upon the interior the finish of the main stories is paneled chestnut stained, and of the dormitories North Carolina pine. The floors in the lobby and main corridor are of terrazzo, in the balance of the first story of maple covered with heavy linoleum, in the basement of granolithic and in the upper stories of maple and quartered oak. Provision is made for three hundred and one lockers in the general locker room, sixty-eight in the business men's section and three hundred and thirty-eight in the boys' section. The pool, 21 by 60 feet, has a floor and 6 foot wainscot of ceramic tile, the remainder of the room being finished in white enamel. The second floor plans for an assembly hall, a running track and kitchen, in addition to the directors', ladies', photo and club rooms. On the third floor are thirty-four bed rooms with necessary toilets, trunk rooms, etc. The building is heated throughout with steam and equipped with fan ventilation for the basement, first story and assembly hall. The fan may be used to flush out all locker rooms and baths. The first floor and the larger part of second floor is of mill construction, while the third floor and the roof are of ordinary joist construction. The cost of the building, including all contracts and fittings, was $102,400, or 16.75 cents per cubic foot. The cubical contents are 611,427 feet measured from top of basement floor to average of roof and including extra depth of boiler room, coal pocket and swimming tank.

HYDE PARK Y. M. C. A. BUILDING, CHICAGO, ILL. PLATE 103. The exterior is of a deep red paving brick, strong in texture, with Indiana limestone trimmings. Throughout the building the finish and floors are of oak except in the bowling alleys, visitors' gallery and class rooms, where maple is used. The reception room and main rooms opening from same have a high wainscot with cap, base and rails of oak and panels of canvas painted in oil, while the walls above and ceilings are treated in water color. The walls of the basement, the auditorium, all sleeping rooms and halls are finished in oil paint. The locker rooms contain eight hundred lockers, each made of steel with open wire faces and sides. The entire structure is fireproof and cost, exclusive of furnishings, $105,000, or 16⅖ cents per cubic foot, figured from the basement floor to the top of the roof.

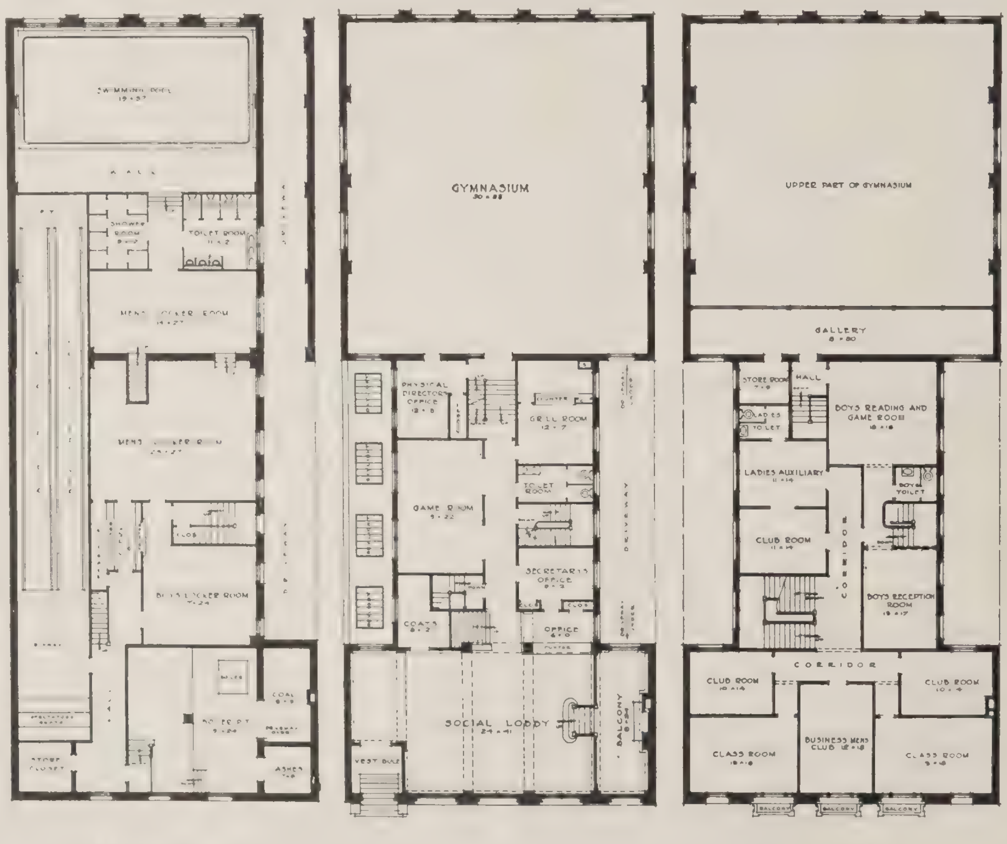
Y. M. C. A. BUILDING, BALTIMORE, MD. PLATES 108, 109. The exterior is finished in Milford pink granite, mottled brick and terra cotta. The gymnasium locker room for men contains seventeen hundred and thirteen lockers and the one for boys five hundred and six. The fifth, sixth and seventh stories are divided into one hundred and twenty-four bed rooms, each having a large closet. Linen, trunk, shower, toilet and private bath rooms are provided on each bed room floor. The entire roof is covered with flat vitreous tiles and is used as a roof garden, the part adjacent to the elevators and stairway being covered. The assembly room on the second floor seats four hundred and forty. The electric light plant, heating apparatus and elevator machinery are placed in the sub-basement. The outside dimensions of the building are 106 by 142 feet.

Y. M. C. A. BUILDING, SAINT PAUL, MINN. PLATE 110. In the basement are fourteen hundred lockers and twelve shower baths for men, four hundred lockers and eight showers for boys and two hundred extra large lockers with eight showers for a business men's club. On the ground floor the annex gymnasium will serve as a third hand ball court. The running track has twenty-three laps to the mile. The seating capacity of the auditorium is five hundred, one hundred and fifty of which are in the gallery. All of the one hundred and forty bed rooms will be outside rooms, while those on the third floor can be changed into class rooms. The lot cost $36,500, the foundations $17,000 and the general contract, together with fixtures, equipment and furnishings, $296,500, making a total cost of $350,000.

Y. M. C. A. Building, White Plains, N. Y. Plate 111. The exterior is of Harvard brick and limestone, with cornices and entrance porch of white pine painted white. The roof is of copper. The general finish of the interior is chestnut stained a dark brown. The floors are of Georgia pine. The locker room accommodates three hundred lockers. The building contains 200,000 cubic feet, measuring from the basement floor to half the height of the roof, and was built for 23 cents a cubic foot, or a total cost of $46,000. This figure included the installation of a running track in the gymnasium, bowling alleys and lockers.

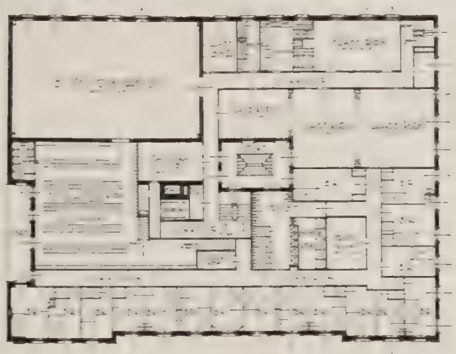
The New Y. M. C. A. Building, Wilmington, Del. Plate 112. The exterior is of brick and stone. The building is of steel frame construction with floors of hollow terra cotta. The spaces between the steel work around the light well are built with hollow terra cotta and covered with corrugated sheet iron painted white. The finish of the reception room, billiard room, etc., is of quartered oak, stained a light brownish gray. The finish of the library, periodical room, restaurant and music room on the second floor is also of oak. The walls of the gymnasium are of cream colored vitrified brick, while the floor is of maple. The radiators are set in recesses in the walls and protected by wire screens. The fourth and fifth floors each contain twenty-eight bed rooms. The upper floors are trimmed with birch stained mahogany color, harmonizing with the cream colored, "sand finished" plaster walls. The basement is finished with yellow pine stained and waxed. The heating on the first floor is by indirect hot air, while in the gymnasium and the rest of the building above the first floor there is direct steam heat. The total cost was $190,000, including the architect's fee, and its unit cost was 33 cents per cubic foot. The furnishings cost about $20,000 additional.

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, MARTINSBURG, W. VA.
Harding & Upman, Architects.



The New Central Y. M. C. A., Philadelphia, Pa. Page 161. The building is of steel frame with exterior walls of brick, excepting the first story front of limestone. The fourth, fifth and sixth floors comprise one hundred and seventeen bed rooms, the dining rooms and kitchen. The mezzanine floors contain administrative offices. Upon the interior the stairways are of Tennessee marble, likewise the wainscot in the entrance vestibule, and the bath and steam rooms. The library and the main hall are paneled in quartered oak extending to the ceiling. Elsewhere the plain plaster walls are painted. The pool is entirely lined with enameled brick which is laid against concrete, a damp proofing course of asphaltic mastic, reinforced concrete and then broken stone. There are thirteen hundred and eighty clothes lockers of steel. The dining room seats two hundred and fifty and the banquet room seventy-five. A large portion of the asphalted roof is intended for skating. The approximate cost of the building was $675,000, of the furnishings $75,000, and of the land about $300,000, making a total investment of $1,050,000.

Bedford Branch Y. M. C. A., Brooklyn, N. Y. Page 164. The building is of pressed red brick, with headers averaging twenty-five per cent of nearly black ends. The base course and portico are of Indiana limestone and the balance of the trim, including cornice and work about the

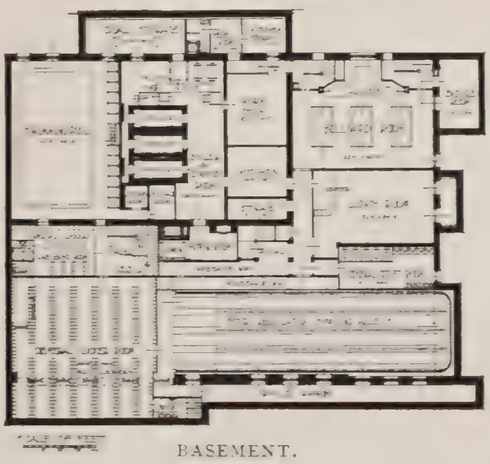


THIRD FLOOR PLAN.

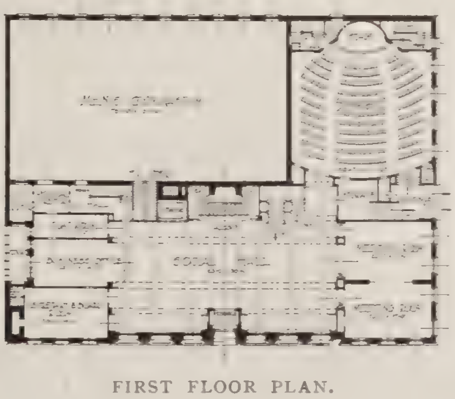
YOUNG MEN'S
CHRISTIAN ASSOCIATION
BUILDING,
OTTAWA, ONTARIO, CAN.

Jackson & Rosencrans,
Architects.

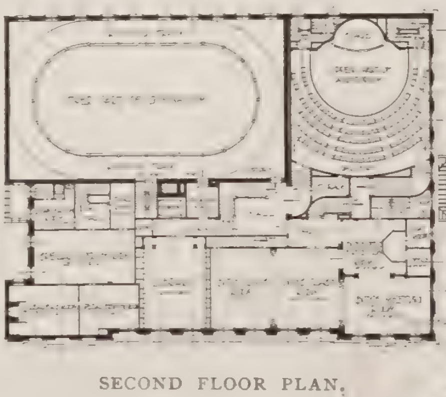
FOURTH FLOOR PLAN.



BASEMENT.



FIRST FLOOR PLAN.

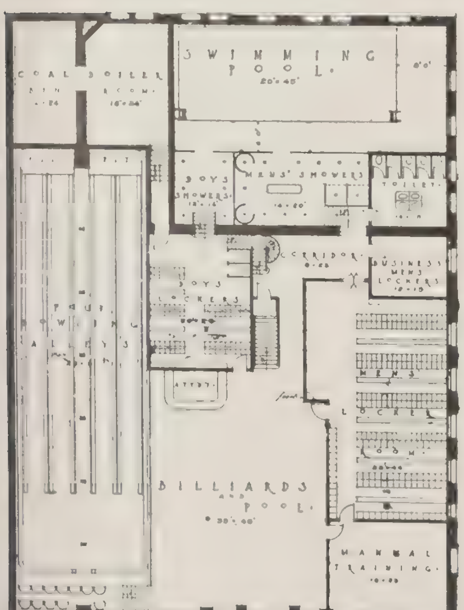


SECOND FLOOR PLAN.

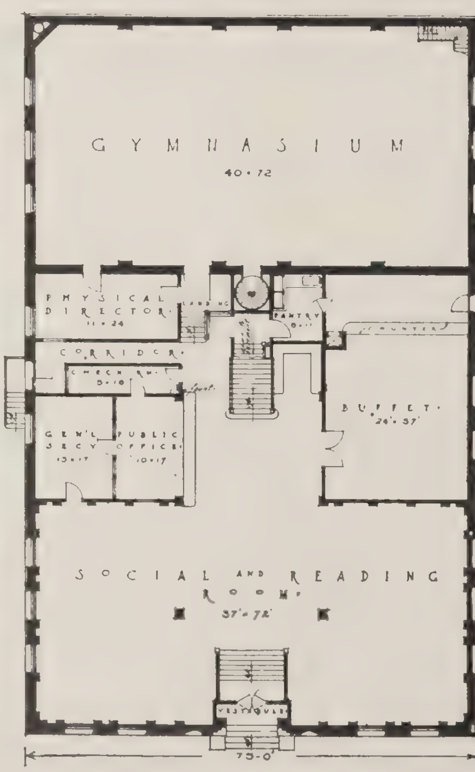
auditorium entrance of gray terra cotta to match the limestone. The exterior steps are of granite. The restaurant is finished in chestnut, the entire second floor in white ash, and the dormitory in white wood and white enamel. steel tank lined with brick and tile. The fifth floor accommodates forty-nine bed rooms with toilets. The building cost 22 cents per cubic foot, exclusive of architects' fees. The cubical contents are measured from the

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, EL PASO, TEXAS.

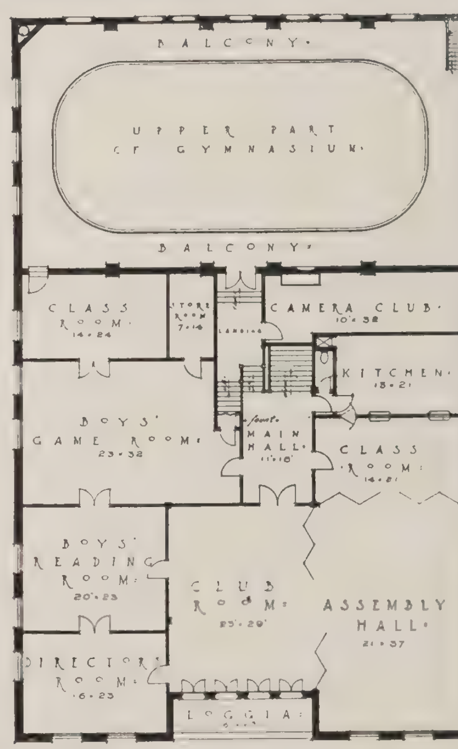
Trost & Trost, Architects.



BASEMENT PLAN.



FIRST STORY PLAN.



SECOND STORY PLAN.

The combined locker rooms contain two thousand steel lockers with expanded metal doors. The bath rooms, the swimming pool room and the entire Turkish bath equipment are tiled. The swimming pool consists of a bottom of footing course to highest point of roof and courts are deducted.

Y. M. C. A. Building, Camden, N. J. Page 165. The exterior is of red brick and limestone. Upon the interior

the walls are treated with plaster painted in light yellows and grays, while the trim is of birch and chestnut. The seating capacity of the auditorium is nine hundred and is planned as one room within another for acoustical effects. The locker rooms have a capacity of one thousand. The fifth floor provides a dormitory of thirty rooms, a visitors' gallery and running track. The building cost 18 cents per cubic foot, figuring from the finished basement floor to the cornice line.

Y. M. C. A. BUILDING, SYRACUSE, N. Y. PAGE 167. The exterior is of cream color terra cotta and red brick. The front vestibule has Numidian marble on walls and ceiling, the lobby is finished in curly red birch stained a mahogany color, while the music room is of ash stained a gray green color. All other woodwork on first story is North Carolina pine. The running track in gymnasium has a space along balcony edge for spectators, with the track placed outside. Direct radiation is used. There are twelve hundred and ninety-two lockers in basement. The assembly room will hold approximately eight hundred people. The fourth and fifth floors provide for seventy-four bed rooms with suitable accommodations for toilets, storage, etc. There are 1,186,084 cubic feet in the building, which cost $263,273.92, slightly over 22 cents per cubic foot. The cubage is taken from basement floor to top of main roof and does not include elevator or fan pent houses on roof, or the excavation for swimming pool.

Y. M. C. A. BUILDING, MARTINSBURG, W. VA. PAGE 170. The exterior has a stucco finish of Portland cement and marble dust with trimmings of Indiana limestone. The side and rear walls are built of common brick. All floors throughout are of yellow pine except the toilet and shower rooms, which are of tile. There are approximately two hundred and fifty lockers. The building contains 270,000 cubic feet and cost complete without furnishings $30,000, or approximately 11 cents per cubic foot. The cubage is figured from the bottom of the basement floor to the average of the roof.

Y. M. C. A. BUILDING, OTTAWA, CANADA. PAGE 171. The exterior is faced with a local red brick with headers of dark reds and blacks, laid up in Flemish bond with joints racked out about ⅜ inch. The columns of the first story, together with the underpinning of the entire building, are of Indiana limestone. The capitals, the doorway and all the trim above this line, including the cornice, are of terra cotta. The lobby is finished in quartered cut oak, and the auditorium in white enameled wood with mahogany doors. The balance of the first story and the library is of quartered cut oak. The locker rooms contain about fifteen hundred lockers. The interior of the gymnasiums is lined with a red pressed brick to a height of 5 feet 6 inches, above which is a gray silica brick. The fifth floor accommodates forty-five bed rooms with toilets, showers, etc. The building is fire-proof and cost per cubic foot, without the architects' fees, 25 cents.

Legal Hints for Architects.—Part II.

BY WILLIAM L. BOWMAN, C. E., LL. B.

SINCE most architects practise their profession chiefly for the remuneration therein, it becomes of primary importance to have the amount of said remuneration definitely fixed, and, what is more often forgotten, to have the times of payment also definitely fixed. The mere fact that you state or write that you are to receive "the customary and usual architect's charges" may not mean anything, unless you can show that the employer had knowlege of such charge, as it has been held that such a statement will not bind a person unfamiliar with such charges. Then again, if the agreement is that the architect shall draw plans and specifications and superintend the construction for a certain sum or a certain percentage of the actual cost, unless the custom and usage of making partial payments is very general in the locality, a situation might arise whereby the architect after completing the plans commits a breach of the contract in some way during the period of superintendence; the contract being entire and the compensation being for said entire contract, the architect could not recover anything upon his contract even for the plans actually prepared and used for the construction of the building.

The remedy for most of these troubles is to have a writing signed by a responsible party, said writing to contain at least the limit of cost of the proposed building, a general specification covering those items which would materially increase the cost, and the statement that one per cent (1%?) of the estimated cost should be due and payable upon the completion and approval of the preliminary studies; two and one-half per cent (2½%?) of the estimated cost should be due and payable upon completion of the specifications and general working drawings, exclusive of details, the remainder of the fee (not to exceed with previous payments five per cent (5%?) of the actual cost of the building) to be due and payable monthly (quarterly or otherwise), based upon the amounts of payment certificates approved by the architect. In most localities there would then be implied by custom into this contract the duty of the architect to comply with all statutes, ordinances and building codes applicable to the *locus in quo*.

(2) Employment by a business corporation involves many additional considerations beyond those we have just noted in cases of employment by individuals. A corporation is a legal person, whose powers and rights depend upon its charter. It is therefore possible, but not probable, for a corporation not to have the power to employ an architect. The chief difficulty in dealing with corporations is to know whether or not the officer with whom you are dealing has the power or has been granted the authority by the Board of Directors to employ an architect. Generally speaking, the employment by the President or General Manager of a corporation is sufficient to charge the corporation with the employment, but the only safeguard to employment is a resolution of the Board of Directors. Of course, if the corporation makes use of the plans and thus ratifies the employment by a non-authorized officer, an architect ordinarily will have no difficulty in recovering his compensation. A situation

frequently arises where plans are ordered and drawn and never used.

A, an engineer and architect, who had had experience in the construction of bridges, went to the office of a large bridge corporation and asked for the President. That officer being out, he met the Secretary and Treasurer and also the Vice-President and stated that he would like to make plans for them for the bridge which they were expecting to construct over the Hudson River from New York to New Jersey. These officers said, "We are the men who carry on the business here and you can talk with us." The architect's ability and experience was discussed and he was then given a pamphlet containing the dimensions, width of span, clear opening, height and other details of the bridge. Said pamphlet further showed that before any construction could be begun or permitted, the consent and approval of the Commissioners appointed by the states of New York and New Jersey would have to be obtained; also that the consent was required to be obtained from the federal government before any structure could be placed over the river; and it further disclosed the fact that the bridge corporation had an engineer and an assistant. The architect spent six weeks upon his work and then submitted to the Vice-President and Secretary and Treasurer an elevation, plans and general strain sheets, which were looked over and pronounced very good. As there had been some misunderstanding regarding the clear height, the architect left the first plans with the officers and started to draw further plans. The latter were completed in about two weeks' time and upon their being shown to the officers they stated that that was what they wanted. Subsequently these officers told the architect that they would submit his plans to the Board of Directors, and still later the Secretary and Treasurer told him that the Board had accepted his plans. Later on the architect prepared an article for publication containing a description of the bridge, together with lithographs of the drawings for the bridge. This article was published by the corporation and stated that the plans prepared by the architect would be used in the construction of the bridge. The Vice-President and Secretary and Treasurer invited the architect to be present on the ceremony of breaking ground for the bridge, and being present he was introduced to various persons as the engineer or architect whose plans had been accepted. The architect's plans were not thereafter used, and upon suit brought to recover for the preparation of the same it was held by the trial court and also by the Appellate Court that there could be no recovery for the plans as furnished or for the labor and time devoted to their preparation. This decision was reached upon the ground that from all that appeared in the evidence the persons who talked with the architect respecting the plans, and the architect himself, did not contemplate either the one to accept or the other to furnish by binding agreement any plans; but that the officers were willing and invited the architect to submit a plan which might or might not be adopted, depending entirely upon certain contingencies; and also upon the further ground that under such circumstances the Vice-President and Secretary and Treasurer could not have the power to accept any plan or create a legal obligation against the defendant in connection therewith. The contingencies which the Court considered were that the work was of such national importance that no plan would or could be accepted until it had passed the scrutiny of the Board of Directors of the defendant corporation and received the approval of the state and national authorities. This one case makes it very patent that in cases of employment by a corporation the architect should assure himself that such employment is pursuant to a resolution of the Board of Directors.

(3) Our consideration of employment by municipal corporations will involve also those questions likely to arise in cases of employment by similar corporate bodies, such as counties, boroughs, towns and villages which are by law ordinarily considered as municipal corporations. Right at the start, the writer, in view of his experience, advises architects never to do any work for any such governmental corporations without consulting an attorney.

The chief matters which require attention are the charter requirements as to the making of contracts by the municipality and regarding the appropriation of money for the work; the thorough understanding of the terms of the contract entered into, and the strict and absolute observance of every clause and punctuation mark in the contract in its performance.

Under most county and village laws and city charters, no contract is valid or legal unless there has been a prior appropriation for the work. This technical requirement is often so strictly construed as to work the greatest injustice, as is shown by the following actual experience of the writer in one of his cases. An architect had been given a signed and sealed contract by the authorized city official to draw plans for a certain building and superintend its construction. Said contract had attached thereto the requisite certificate of the head of the department that the estimated cost was a certain amount, chargeable to a certain fund previously appropriated, and also a certificate of the comptroller that there was at hand an unexpended balance sufficient to pay the estimated amount for the work contracted for. The facts were that there had been an original appropriation by the proper Board of $18,000 for the work. The architect found upon investigation that in order to have the building conform to other structures of a similar character in the city it would require about $30,000. The appropriating body were asked to appropriate the additional $12,000, but took so much time in so doing that the head of the department, believing the work essential and necessary, decided to take the additional moneys required from his general department appropriation. Said determination was shown by the contract and approved by the comptroller by his certificate thereto attached. Thereafter the preliminary plans were drawn and approved and the one per cent due the architect paid out of the two funds by the comptroller of the city. After the working drawings and specifications had been completed, the work was abandoned, chiefly on account of the death of the official having said work in charge, and the city thereupon refused to pay the balance due the architect for the work actually done and completed by him. An action was duly brought to recover said balance and upon the trial the case was dismissedupon the ground that there was no specific appropriation of $30,000, the estimated

cost of the work. So it was that the architect lost not only the value of his services and work actually performed, but court costs and his own legal expenses. The fact that the actual appropriation of $18,000 was still untouched in the city treasury and sufficient to pay his just claim, and the further fact that the acceptance and retention of the work and the payment by the comptroller of part of the contract price would seem to constitute a ratification or at least to create an estoppel against the city, availed nothing. However, this merely verifies the strict rule which is carried out by courts for such governmental bodies, that once the contract is proved void or illegal there can be no recovery upon *quantum meruit* or for the reasonable value of the work done, even though the city, as a matter of fact, had been benefited by the same.

The charter provisions or statutes and their legal interpretation differ as to the requirement of a written contract and as to the requirement that all contracts for work requiring more than a certain amount shall be awarded after due advertisement to the lowest bidder. For example, the law of New York seems to be well settled that the engagement of an architect is an exception to the general rule requiring a written contract, advertisement, etc. On the contrary, in Massachusetts it has been held that a county is not liable under a much similar statute for architect's fees exceeding $800 unless the contract is in writing, after due advertisement for proposals. These two contrary determinations show that in dealing with statutes one cannot be sure that the statute means what it says, though, as a general rule, if the strict requirements of the statute are not followed, there should be an immediate investigation made to see whether the variation is permissible under the decisions interpreting the statute.

The ordinary municipal contract to-day contains so many unreasonable and unfair clauses that the writer has reached a personal opinion that in signing such a contract the contractor or architect gambles worse than on the stock market. He frequently becomes an insurer and an exponent of faith, hope and charity.

Let us consider one of the usual clauses in architect's contracts, which provides as follows: "The architect shall on or before the first day of November, 1904, furnish a set of preliminary studies and specifications, together with an estimate of the cost of said building or structure. If the said preliminary drawings and specifications and estimates are not satisfactory to and approved by the commissioner, then the architect shall and will revise and correct the same so as to conform to the suggestions and criticisms and requirements of the commissioner, and so that the estimated cost, including the architect's fees, of the cost and service and inspection shall be well within the sum of $48,000, the funds available for said building or structure."

It had been judicially determined that under such a clause it was not necessary that the preliminary drawings, specifications and estimate should be within the sum mentioned and it was intimated that if the estimated cost, including architect's fees, ran above that figure it would become a question for the jury to determine whether or not there had been a substantial performance of the contract by the architect. In the latest case, however, the same Court held that the architect was bound to furnish not only preliminary plans, drawings and specifications which, with the architect's compensation, should be within the limit of cost of $48,000, but that the final drawings, which must include the suggestions and criticisms of the commissioner, should also be within the $48,000. The facts in the case were that the architect drew preliminary plans and specifications, the estimated cost of which, including his fees, was within $48,000. These preliminary plans were not approved by the commissioner, but were revised and changed to meet his approval. These revisions were in the nature of betterments, and the commissioner was advised that by making said changes he was increasing the cost. The architect was told to proceed with the work and follow his requirements and suggestions, which he did. When the final plans and specifications were approved by the commissioner, the architect estimated the cost as about $58,000, including his fees. The engineering staff of the commissioner thereafter suggested further changes, and while the commissioner did not finally determine to make the same, yet it resulted in putting off the advertisment for bids upon the plans for almost a year, during which time prices advanced. The plans were finally advertised, but the lowest bid received was $66,000, exclusive of architect's fees. Thereafter the work was abandoned. Upon suit to recover for the services performed, the Court held that the architect was not entitled to anything, upon the ground that the contract clearly indicated that the amount appropriated for the building was not to be exceeded, and there being no larger appropriation, the amount of the appropriation bound both the plaintiff and the commissioner, or, in other words, that since the architect obeyed the instructions and requirements of the commissioner, as required by the contract, and yet failed to keep the cost within the amount appropriated, he thereby lost his compensation for his work.

Another clause of the same contract provided for the payment of one per cent upon the completion of the drawings and specifications called for by the clause hereinbefore set forth, and it was contended that the architect was at least entitled to that one per cent. The Court held to the contrary, on the ground that the approved revised plans did not come within the limit of cost of $48,000.

This case and others seem for the present to establish a new rule of law in such employment, that where an architect contracts to furnish plans not to exceed a certain cost and the bids being largely in excess of said cost so that the plans are abandoned, the architect loses his right to any compensation for the work done. This seems an exceedingly harsh and unfair requirement to put upon an architect, especially when one notes the range of prices bid by contractors upon the same plans pursuant to the ordinary advertisements for bids. How can a municipality conscientiously and fairly ask an architect to plan a building and make his remuneration dependent upon his following not only the requirements and suggestions of the official in charge, but also refuse to give him any credit in case there is delay in advertising for bids, especially when the contractors' bids will vary thirty per cent on the same plans? However, the Courts have so held and it behooves architects to take it into consideration in this class of work.

Editorial Comment and Miscellany.

PLATE DESCRIPTIONS.

MOHAMMED TEMPLE, PEORIA, ILL. PLATES 104, 105. The building is faced with a dull red brick of paving character, laid with rodded horizontal joints ⅜ inch thick, raked out ⅜ inch deep, and with vertical joints flush. The trimmings are of brown and dull green terra cotta. The columns, capitals and the Shrine Emblem are in polychrome terra cotta. All roofs are of copper. The building is heated and ventilated with a fan system of such capacity that the banquet room in the basement can have a complete change of air every three minutes and 1200 cubic feet per hour per individual in the auditorium. There are approximately sixteen hundred seats in the auditorium, including four hundred and fifty in the arena. The cost of the building was $95,969, exclusive of the decorating, seating, lighting fixtures, stage equipment and organ, while the cost per cubic foot was 10.1 cents. The cubical contents were figured from the basement floor line to the average height of the roof for each particular section of the building.

WHITE SHOAL LIGHTHOUSE, NORTHERN END OF LAKE MICHIGAN.
Built of white matt glaze terra cotta, made by the Atlantic Terra Cotta Company.
Major W. V. Judson, U. S. A., Engineer.

LINDEN BAPTIST CHURCH, CAMDEN, N. J. PLATES 106, 107. The building is 76 feet long by 88 feet deep and has a seating capacity of about six hundred. The main feature of the church is the great dome covering the whole of the auditorium. It is 27 feet high from the springing line to the center of the top, with a radius of 36 feet 2½ inches. The dome is supported by sixteen octagonal pillars, 32 feet in height and 32½ inches in their greatest diameter. The slabs and roof covering of the dome are carried on sixteen curved rafters of wood, built up of yellow pine boards, 1 inch thick, and curved to the desired radius. The lower ends of the curved rafters fit into a cast iron shoe bolted to a ring which encircles the top of the sixteen columns. The upper ends of the rafters are bolted to a steel ring, which also receives the top structure of the dome. On top of the rafters are laid two thicknesses of 1 inch yellow pine with the joints carefully broken. The whole of the roof surface is covered with three ply layers of roofing felt which are carried to the base of the dome and there cemented into the main bed of the roof. On top of the roofing felt are fifteen courses of concrete slabs, varying in size from 77 inches to 33 inches in length, 31 inches in width and 1½ inches in thickness. The covering tiles and the slabs are frequently interlocked at all joints. The interior of the dome is coffered, the inner surface of which is covered with slow burning plaster board, while the ribs and rafters are covered with poplar boards. The windows are of white glass with colored designs set in heavy leadwork. The interior of the church follows the Byzantine style, and is finished in white with decorations in gold and color. The furniture is in green antique.

DETAIL FOR THEATER.
Executed by Conkling-Armstrong Terra Cotta Company.
Albert E. Westover, Architect.

DETAIL BY DENBY & NUTE, ARCHITECTS.
South Amboy Terra Cotta Company, Makers.

GERMAN TOWN PLANNING.

A NUMBER of English architects interested in the question of Town Planning recently visited Ger-

many and Austria for this purpose and have issued some interesting data. They found that in Germany the municipal authorities have great powers and can purchase land and resell, or develop portions for extension of towns or outlying suburbs. Towns such as Dusseldorf, Cologne and Frankfurt, which for many years have been kept within a ring of fortifications, have gradually become more and more overcrowded by the growth of population, so that in some cases it is possible to find rows of streets having a width of not more than 10 or 12 feet, with overhanging stories which reduce this space in the upper floors so much that it is possible to shake hands across the street. Since the fortifications have been abolished large tracts of land belonging to the municipalities have become available for the extension of the towns, and splendid opportunities have presented themselves for the laying out of suburbs and provision of open spaces for public recreation.

DETAIL BY BARNETT, HAYNES & BARNETT, ARCHITECTS
Winkle Terra Cotta Company, Makers.

APARTMENT HOUSE, CENTRAL PARK WEST, NEW YORK.
Terra Cotta furnished by the New York Architectural Terra Cotta Company.
Schwartz & Gross, Architects.

In the town of Essen, the home of the Krupp industries, have been planned some very interesting colonies for housing their employees, including accommodation for all classes of workmen, viz.: quarters for bachelors, married couples, foremen, old married men who are beyond working age and convalescent homes for invalids. The houses are invariably built of brick, some having the brickwork finished with rough cast. Another example of skilful planning is at Gladbach, about ten miles from Cologne. The land is sold at the rate of $1500 per acre. The sites have to be purchased and paid for outright, and the town authorities lend ninety per cent of the value of the house, at the rate of three per cent interest per annum, and a free conveyance is given. The plans are included in the cost of the house. All the land is bought up by one owner and all the plans prepared by two architects. The soil is very poor so that rich soil has to be imported from other districts for the gardens. The houses are all sold freehold, and between eighty and ninety houses have been built in seven years. All single family houses on this estate have a minimum of five rooms, *i.e.*, three bed rooms, one living room and one kitchen with a small scullery adjoining.

DETAIL BY JAMES KNOX TAYLOR, ARCHITECT.
Executed by the New Jersey Terra Cotta Company.

Everywhere in Germany town planning is regarded as one of the most important functions of the town council. Courses of lectures on the subject are given in technical schools and universities, and the literature concerning it is extensive.

DETAIL BY STEARNS & CASTOR, ARCHITECTS.
Executed by O. W. Ketcham Terra Cotta Works.

ASIATIC BRICK.

WE should hardly expect to learn much of the arts of civilized life from the tribes of central Asia, yet it seems they make better brick than we turn out. The barbarians employ the same material that we do, and, curiously enough, the thing that imparts superiority to their process of brickmaking is one of the powerful agents of Western civilization—steam. When the Asiatics have baked their bricks for three days, the opening of the oven is closed with felt, which is kept wet, so that the bricks, intensely heated, are enveloped in steam. The process causes a remarkable change in the character of the bricks. From red they turn gray, and at the same time acquire a remarkable degree of toughness and hardness. Although porous, they give out a sound when struck like that of clinkstone, and they are said to resist the efforts of weather much better than do the bricks of Western make. Necessity was the mother of invention in this case, for the climate in which these ingenious Mongols live is subject to great extremes of temperature, having a disastrous effect upon bricks made by the ordinary process. — *Scientific American.*

ENTRANCES TO RAND, McNALLY BUILDING, CHICAGO, BURNHAM & ROOT, ARCHITECTS.
One of the first skeleton buildings erected in this country, now being demolished. The building is of brown semi-glazed terra cotta, made by the Northwestern Terra Cotta Company. The illustrations are from photographs recently made.

PAVILION BY JOHN V. VAN PELT, ARCHITECT.
Faience tile frieze in rich colors executed by Hartford Faience Company.
Roofed with Ludowici-Celadon Tile.

IN GENERAL.

The Ninth International Congress of Architects will be held at Rome from the 2d to the 10th of next October. His Majesty, the King of Italy, has consented to act as patron of the Congress, and the Ministers of Foreign Affairs, of Public Instruction and of Art have consented to act as Honorary Presidents. The Congress will be inaugurated in the historic hall of the Horatii and the Curiatii.

The Third Exhibition of the Rhode Island Chapter, A. I. A., will be held in Memorial Hall, Providence, October 21st to November 1st. Entry slips must be received before September 30th, and exhibits before October 11th.

The Western Brick Company, of Danville, Ill., furnished the brick for Mohammed Temple, Peoria, Ill.,

Hewitt & Emerson, architects, which is illustrated in the Plate Forms of this issue.

The Y. M. C. A. at Norfolk, Va., Wood, Donn & Deming, architects, illustrated in the Plate Forms of this issue, was built of Fiske's "Tapestry" brick.

Clarence Wilson Brazer and E. Donald Robb have formed a copartnership for the practice of architecture, under the firm name of Brazer & Robb. Offices, 1133 Broadway, New York.

STORE AND OFFICE BUILDING, CUMBERLAND, MD.
Terra cotta furnished by Conkling-Armstrong Company. Bricks furnished by Hydraulic-Press Brick Company.
George F. Sansbury, Architect.

The Atlantic Terra Cotta Company furnished the architectural terra cotta for the Y. M. C. A. Building at Ottawa, Ont., Jackson & Rosencrans, architects; the Bedford Branch Y. M. C. A., Brooklyn, N. Y., Jackson & Rosencrans, architects, and the Y. M. C. A. Building at Syracuse, N. Y. Gaggin & Gaggin, architects. These buildings are illustrated in this issue.

Mauran, Russell and Crowell, architects, of St. Louis, have opened an office at Dallas, Tex. Harre M. Bernet, representing them, desires samples and catalogues.

Sayre & Fisher Company supplied the brick for the Bedford Branch Y. M. C. A., Brooklyn, Jackson & Rosencrans, architects, which is illustrated in this issue.

The Hydraulic-Press Brick Company furnished their brick for the Y. M. C. A. Building at St. Paul, Clarence Johnston, architect, which is illustrated in the Plate Forms of this issue.

Y. M. C. A. BUILDING AT PLATTSBURG, N. Y.
Built of Fiske's "Tapestry" Brick.
Jackson & Rosencrans, Architects.

The new eight-story building for the Washington Investment Company, of Washington, D. C., J. H. de Sibour, architect, is faced on all sides, from the first story up, with white vitreous porcelain finished terra cotta, made by the O. W. Ketcham Terra Cotta Works.

Plant No. 2 of the Western Brick Company, of Danville, Ill., is now in full operation, the product being a matt face brick, shading all through the reds and browns.

HOUSE BUILT OF HOLLOW TERRA COTTA TILES, FURNISHED BY CARTER, BLACK & AYERS.

THE BRICKBUILDER

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BIGELOW & WADSWORTH; CARRÈRE & HASTINGS; FOOTE & TOWNSEND; GARBER & WOODWARD; EDWARD G. GARDEN; GREEN & WICKS; D. D. WILLIAMSON AND HILL & STOUT; MARINER & LA BEAUME; JOHN KEVAN PEEBLES.

LETTERPRESS

CHURCH OF NUESTRA SEÑORA DEL CARMEN, TEHUACAN, MEXICO.

Polychromatic decorative scheme composed of tile in the following colors: white, yellow, blue, green and orange.

Decorative Treatment of Plaster Walls.

BY WILLIAM L. PRICE.

As NEW conditions arise, as civilizations wax and wane, architecture keeps the records. No conditions, however vital with new thought, no matter how surely dying of a banal and fruitless renascence, but leave their mark on architecture. Either the touch of new sincerities and new beauty, or the scar of degenerate and unthinking niceties. Living men build in architecture living ideals; dead men in the name of culture paw over the scrap heaps of the past.

I have looked vainly among the cloying refinements of our large modern buildings for some vestige of self expression, some vital spirit, even for intelligent use of the old — their marble work is not even real marble work, let alone art. Our high buildings are our one stupid contribution to building — I will not say to architecture because as architecture they have not yet arrived. They are feats of engineering and decoration, and most of them are stupidly designed even as decoration. Our libraries, State and other public buildings which have a core really built of brick and steel and concrete are merely covered with a layer of unrelated marble. They might as well be veneered an inch thick for all the intelligence shown in columns that support abortive pediments, recesses made in walls for the sake of the columns to be set in them, pasted on pilasters that hang on the walls they are supposed to buttress, moulding, column and pediment wormed over with borrowed and meaningless ornament. Our new forms of construction, steel and concrete, have scarcely been looked at as a possible medium for expressive beauty.

MARLBOROUGH-BLENHEIM HOTEL, ATLANTIC CITY.

There is no modern method of construction so fertile in its suggestiveness as reinforced concrete and hollow tile. Much has been written about the construction itself but little attention has been given to its possibilities as an incentive to design.

There are a number of architects who are using it intelligently but a vastly greater number who, hampered by the traditions and fetters of the renascence, are still using the old details and the old motifs of decoration in an utterly inappropriate medium and without a reasonable relation to the life of to-day.

In our slavery to form we have nearly forgotten the meaning of ornament. We go on reproducing details and forms of ornament which were designed for marble, in stone, wood, cement, anything and everything, and even where we work in marble we still hang festoons of flowers indiscriminately on bank buildings, on railway stations, and still stripe our walls up with unmeaning pilasters and mouldings. Mouldings are either to form watersheds on walls or for the purpose of ornamental or protective shadow, and ornament should be the glorification of the necessary materials of the building in such a way as to add to its beauty and at the same time express some purpose or some feeling inspired by the building or its use.

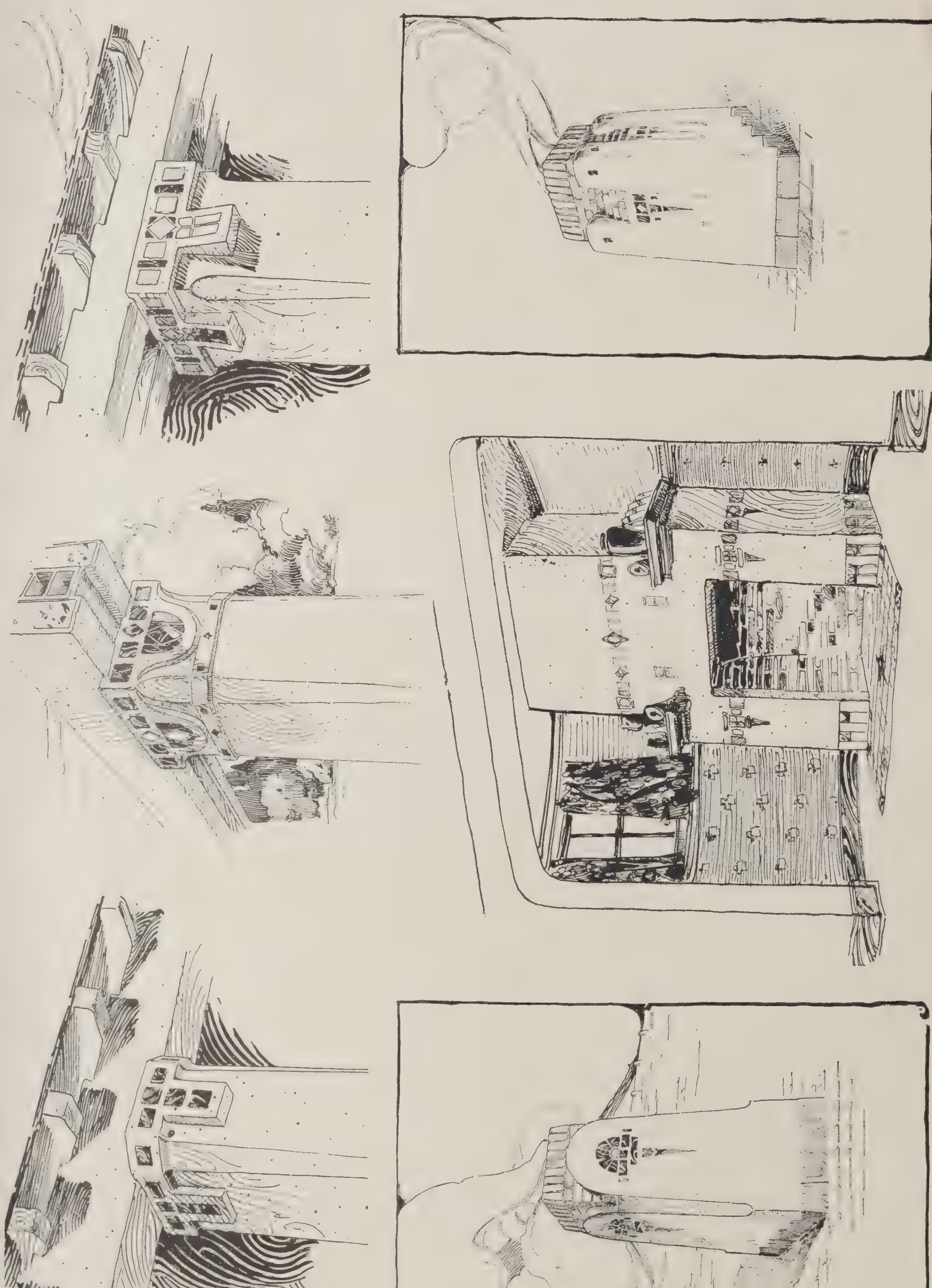
When we are considering plaster surfaces, whether of concrete or of plaster coated tile construction, there is no excuse for expressing block construction; either we have a material cast in a mould or a trowel applied surface over some other material for protection and beauty.

Practically all of the details handed down to us from the past are wood, stone or marble forms, the renascence using stone forms for all materials as we do, making its wood details of layers as in stone walls and using column and pediment as ornament. But concrete and stucco are neither wood, stone nor iron and while it is quite possible to make moulds in which concrete may be cast, imitating stone forms, it is quite inexcusable and an admission by the architect that he is totally unable to design or think in terms of the materials used.

Quoined corners, columns with base and capital, layers of egg and dart or dental ornament can only give one the impression of the block or layer construction out of which they grew and have no place in plaster buildings.

The use of inlay in plain wall surfaces or on mouldings is not new and most of it is trivial. It is usually an attempt to paint in varicolored fragments and it almost never gives the impression of being part of the wall it is supposed to decorate, whether inlaid or covering the whole surface. The reason for this is that it has not been used as a decorated portion of the wall surface but as an applied ornament.

If a closely allied material which can be reasonably embedded in the wall surface be used in such a way as to seem a part of that surface, there can be no objection to such use of color for enrichment instead of modeled ornament; and burnt clay products which can be fashioned in innumerable forms and colors, glazed and unglazed, when so separated in design as to allow the wall surface to penetrate and tie it to that surface is almost an ideal form of wall decoration.



SKETCHES SHOWING USE OF COLORED TILES TO ORNAMENT PLASTER SURFACES.
William L. Price, Del.

DETAIL OF MARLBOROUGH-BLENHEIM HOTEL, ATLANTIC CITY.

DETAIL OF REEDS STORE, PHILADELPHIA.

Tiles are now available, roughly enough formed and surfaced not to be either hard or fussy, and tile layers and plasterers are not wanting with the skill to so work their materials together that wall surface, tile and jointing make an harmonious whole. There is no limit to the possibilities open to the designer in the use of this material and when combined with dull glazed terra-cotta for copings, domes or whatever surface it is desirable to protect from wet and frost, may be made to produce color and texture harmonies just as chaste as the most hallowed classic and far more appropriate to our own time. Even in the humblest plaster cottage a few spots of color, some symbol of its owner's interests, some theme suggested by its location, may be worked out to give the greatest distinction to the simplest design. We must never forget that the color spots that seem brilliant or even glaring in the sample, tone down when out of doors, surrounded by nature's dazzling tones. Persian trimming on a woman's dress by itself is quite gaudy but used sparingly it gives just the livening touch to low toned stuffs that lift them out of the commonplace.

LAMP POST, HOTEL TRAYMORE, ATLANTIC CITY.

Our decorative artists are doing wonderful work on paper for magazine covers, for advertisements and for posters. Why should we architects not build in lasting form something at least approaching in significance and beauty these daily creations of our fellow craftsmen?

FIREPLACE.

We admire the wonderful color of old marbles and mosaics in San Marco. We are fascinated by the painted walls of Germany and the Tyrol. We look upon the time mellowed color of the old, but we hesitate to reach after color effects in our own work. We have a chilling fear of the barren niceties and tepid enthusiasm of what we call culture. We glorify restraint and curb our enthusiasm except as to the work of dead men. Our attempts at color in architecture show either an over restraint or garish crudeness. We are like the men at the beginning of the renascence who waking up to the barbarism of the glorious and riotous building of the gothic period, substituted in their day the culture of other days instead of refining their own vital and uplifted art. No doubt the painted and gilded carvings of a new gothic church would be shocking to us who love the soft dingy mystery of their decay.

Why not keep the knowledge and culture of other days while expressing without fear the vital meanings of our own day? And this middle ground is quite within our reach; we know how to produce the rare and dazzling materials of which we might build an architecture as sincere as the gothic, as chaste as the Greek, but as new as Oklahoma, and we can do this without embarking our clients on the bottomless sea of extravagance. We are spending enough on fool mouldings, on useless and meaningless detail even in simple houses, to pay for a few spots of real decoration built into wall or porch or around the fireplace that we now desecrate with the cold and hard tiling of the commercial tiler, which is quite appropriate in a bath room and quite out of place in a living room or out of doors. The soft hand made tile which has had the personal interest of its maker will cost little if spotted into plaster. And there is no limit to the possibilities of combinations of brick, plaster, marble and tile. We could rival the glories of painted walls, of inlay and fresco, and do it in a more legitimate way than ever before.

Our limitations are not in our materials or opportunities but in our timidity or laziness, in lack of something to say rather than in the way to say it.

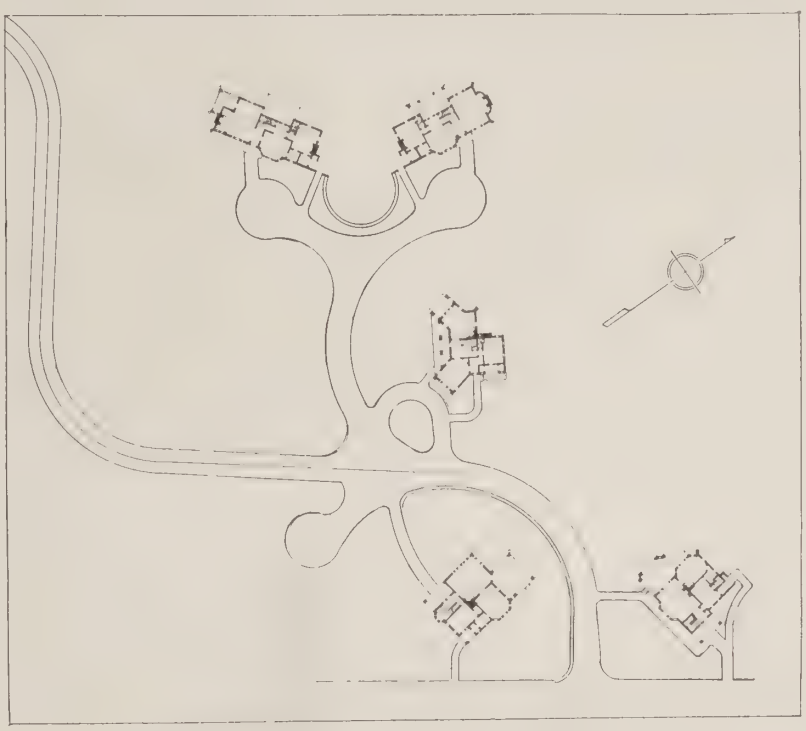
Group of Houses at Moylan, Rose Valley, Pa.

BUILT OF TERRA COTTA HOLLOW TILE WITH PLASTER FINISH AND COLORED TILE DECORATION.

PRICE & MCLANAHAN, ARCHITECTS.

ABOUT fifteen miles from Philadelphia, separated by a series of hills and valleys from the clatter and disturbance of railroad traffic, is situated Rose Valley. Rose Valley has gained in prominence not alone by the fact of its delightful location with the accompanying attractiveness of its homes, but particularly for the reason that here associated together in sincerity of purpose architect and craftsman, artist and literary folk, have chosen to live their own life in the home, making the best, in its establishment, of the material at hand for what it is or may become. Thus in effect the highest possible expression of the individual has come to be realized, although the expression of the individual as a unit is in no sense inconsistent with the harmonious whole, and the general results are not characterized by any uniformity of type.

In the development of the hillside illustrated by the accompanying photographs at Moylan, the unity of relationship to the environment has been carefully preserved, and the types of dwellings, though largely a matter of personal taste with the architects, conform admirably to and appear to grow easily out of the site.



PLOT PLAN, GROUP OF HOUSES AT MOYLAN.

These homes are primarily intended for artists, so among the conditions naturally imposed in their arrangement is the importance of a well proportioned and amply lighted studio. This condition has been met by providing large rooms extending the width of the house, and in some instances of clear height of two stories with direct exposure to the north. In addition to this the ensemble of the adjacent rooms has been considered particularly for comfort and utility. Broad porches and out of doors sleeping accommodations have been added where the best exposure and prospect is to be offered, and the relationship of house to house within the group is so established that no objectionable feature of any adjoining property is imposed upon its neighbor. Service yards are separated by lines of well arranged hedges or attractive fencing, and the approach from the highway is over a winding drive common to all properties.

In regards to the houses individually, the nature of the materials employed in their construction has been altogether preserved. No false impression is to be gathered from any of the details. Under a present day impulse new structural conditions as exemplified in concrete and hollow tile have been accepted. These demand a specific surface treatment and naturally point the way to the accomplishment of a plastic art whereby perhaps an indigenous expression, typically American, is to become established. The manner of ornamentation is characteristic of the work of the architects employed. The idea that the ornamentation of the wall must be constitutional has not been altogether recognized, as applied decoration in the form of ornamental Moravian tile has been largely employed in the fashioning of the whole, particularly where color is destined to play a significant part. In the designs of the chimneys, this is well illustrated in the relation of form to color. Naturally photographs do not illustrate the imporance of this, since the color so necessary to the complete expression of the form is lacking. Attention should be called to the manner in which the houses grow up from their foundations. Rose Valley hill is naturally a rocky eminence, and to establish a friendly relationship with the structures the walls are first erected of this material, but the identity of the stone is finally lost by a gradual merging of the mortar of its joints into the full plaster wall surface above.

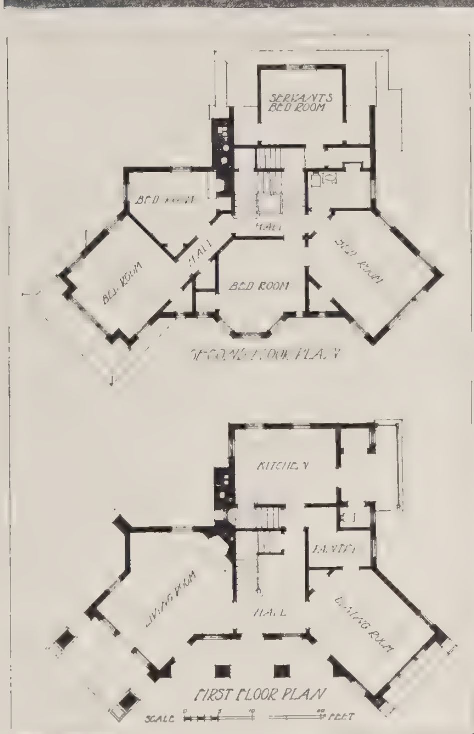
Mention should be made of the general interior treatment. Plain wooden trims without mouldings are provided at all doors, while at the windows the plaster is rounded and returned in at the jambs and heads. In the stairways the usual type of square or turned balusters has been banished, and plain plaster balustrades with simple wood caps have been introduced. Yet the resulting impression in its completion is neither new nor hard. The quiet and simple lines lend something of that dignity which we expect to find only in the old. Herein lies the success and comfort of the interior treatment of these homes. The work has been handled so as to constitute an entity, a complete work of art — complete because every day life has here found an expression in consonance with its own daily existence.

HOUSE AT MOYLAN,

ROSE VALLEY, PA.

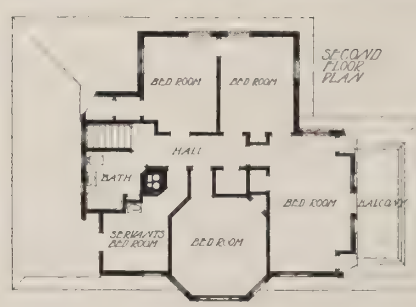
Price & McLanahan,
Architects.

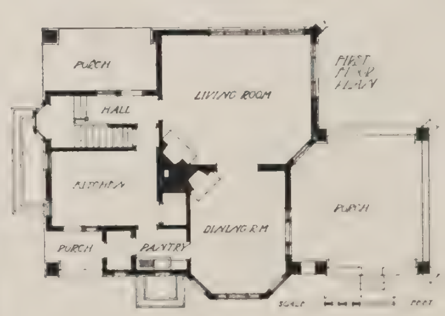
SECOND FLOOR PLAN



HOUSE AT MOYLAN, ROSE VALLEY, PA.

Price & McLanahan, Architects.





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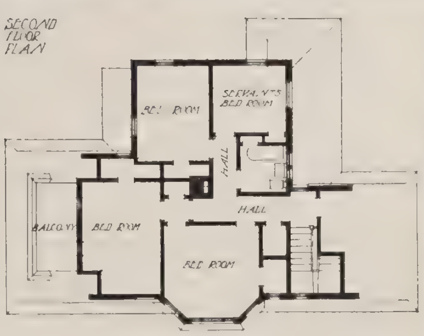

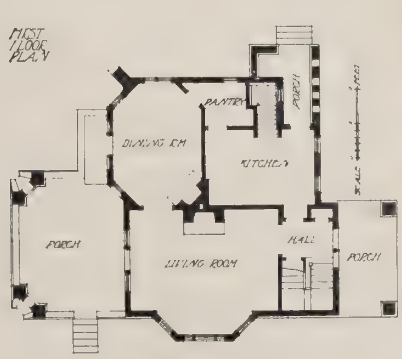

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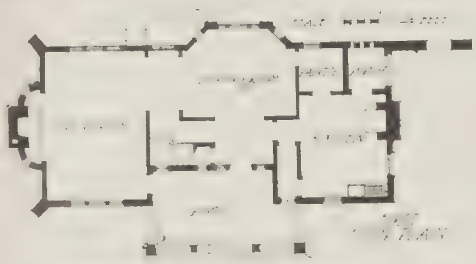

HOUSE AT MOYLAN,

ROSE VALLEY, PA.

Price & McLanahan,

Architects.

Architects in Charge of Construction.

BY WALTER B. CHAMBERS.

THIS article is not intended to be anything more profound than a brief discussion of the trade-contract method of conducting building operations, and the presentation of a few points in its favor as compared with the usual "general contract" method.

Of the various ways to go about erecting a building, by far the commonest is to put the work into the hands of a "general contractor." It is usually awarded to him after he has been selected from among several competitors who submit their bids based on the architect's drawings and specifications.

The general contractor is a middle-man. He is rarely a mechanic or a direct employer of skilled labor. He takes the architect's drawings and specifications to his office and calls in his sub-contractors, — firms or individuals carrying on the various building trades, — whom he invites to submit to him their bids for that part of the work which is to be done under their particular trade. In this way he gets his bids for the carpentry, plastering, heating, plumbing, structural iron, ornamental ironwork, etc. To the sum of the most favorable bids he so obtains, and which represent the real cost to him of putting up the building, the general contractor adds his own profit, generally 10%, and then offers the owner this sum as his bid for doing the work. If it compares favorably with estimates similarly made up by other general contractors who have been asked to submit bids, the work is awarded to him.

Viewed from the owner's standpoint there are many disadvantages attaching to this way of building. That the owner's viewpoint is the right one for the architect is unquestioned, as he is the owner's agent in the transaction, and while it is his first duty to be fair in all his dealings and rulings, his legal position naturally causes him to look after the owner's interests with special care.

An honest, competent and experienced man acting as the general contractor can be a very effective aid to a building enterprise; there are many such men in the business, and their employment is wise in many cases.

Architects who are more interested in the artistic than in the practical problems connected with their work will welcome the opportunities which the employment of an efficient general contractor affords them, of shifting responsibility to his shoulders. It is comforting and reassuring to feel that one's work is being well and promptly executed through the activities of your contractor — that your client's end of the contract is being honestly lived up to by the "party of the first part." But how many times is such confidence well placed? Builders are, as a rule, no more unselfish than most business men, and at best they are, and naturally so, a little more anxious about their own interests than anyone else's. It is clearly improper to leave in their hands any power to choose or direct or to exercise discretion of any importance. In other words, it is the architect's plain duty to look after his client's interests himself and not delegate any of that duty to the man who has the other end of his client's contract.

But many times the employment of a general contractor adds to, rather than lessens, the architect's difficulties in controlling and directing a building operation, by intervening between him and the sub-contractors. Being responsible legally only to the general contractor, the sub-contractor can evade carrying out instructions received directly from the architect by interposing his employer and claiming that all orders to him must pass through the latter. Technically he is perfectly right in this position; but when, as is often the case, it is made use of to thwart the carrying out of the architect's wishes, the latter looks about for some other system of legal relationships and responsibilities which will be a help to him instead of a hindrance. He can find this in the "trade-contract method."

By the trade-contract method the architect, acting for the owner, makes direct contracts with each of those manufacturers and employers in the different building trades who under the other method are only sub-contractors of the general contractor.

To do this properly, the drawings and specifications must be prepared in considerably greater detail, and a much larger number of copies of each are needed for sending out to the tradesmen to secure estimates; for it is necessary to take at least six estimates in each trade in order to get the benefit of the competition, which is one of the chief purposes of the procedure.

There are two signal advantages of this contract-by-trades method, — first, the *more direct control* over the work which it gives to the architect, and second, the reduction in cost, through the greater amount of competitive bidding by the many would-be contractors, and through the elimination of the general contractor's profits.

The importance of the first of these cannot be too greatly emphasized, for it deals with those matters which make the difference between satisfied and dissatisfied clients successful or unsuccessful operations. For that reason it is even more important than the second, since efficiency and energy in carrying out a building are even more to be desired, in most cases, than rock-bottom prices. Still, there is no surer way to obtain for a client one hundred cents' value for every dollar expended, than by this contract-by trades procedure.

Another advantage is that inspection and superintendence of work in progress, both at the shops and at the building, is made easier for the architect. Under the ordinary system, when the architect or his representative visits the sub-contractor's shops and thinks it necessary to order changes or corrections, he finds his directions accepted by the sub-contractors "subject to the approval of the general contractor." The reason is obvious, — the sub-contractor, being responsible legally only to the general contractor, doesn't propose to let himself be committed to any modification of his contract without the latter's sanction. This puts the architect in an awkward position. It is as though the colonel of a regiment was told by the lieutenant to whom he had given an order, "I'll carry it out if my captain approves."

The military analogy, though not perhaps a true one, will do to illustrate the awkward state of affairs, — a state of affairs which can't exist under the trade-contract system, where each tradesman has his legal relations direct with the owner.

How many trade-contracts are needed in a building operation? This depends both upon the nature and the

location of the building. An office building in a large city requires over fifty; — a city residence a little more than half that number.

The greater the number the greater the advantage to the owner, and also the greater the complications and difficulties in management and direction on the part of the architect. Too much sub-dividing is apt to defeat its own object. Following is a fairly typical list of convenient trade-divisions into which the erection of an ordinary city building may be separated: —

1. Demolition of existing structures.
2. Excavation, shoring, etc.
3. Masonry.
4. Waterproofing.
5. Bluestone.
6. Limestone and marble.
7. Granite.
8. Fireproof construction.
9. Structural iron.
10. Iron other than structural.
11. Sheet metal work and roofing.
12. Metal furring and lathing.
13. Plastering.
14. Carpentry.
15. Joinery and cabinet work.
16. Plumbing.
17. Heating.
18. Electric work.
19. Interior marble and slate.
20. Tiling.
21. Concrete paving.
22. Elevator plant.
23. Painting.
24. Glazing.
25. Hardware.
26. Lighting fixtures.
27. Special finish and equipments.

The preparation of the drawings, specifications and contract papers needed for separate trade-contracts is arduous in direct proportion to the number of sub-divisions. They have to define clearly not only just what work is to be included in each, but also just how the work of the other trades will affect each one. The contractors must know at the time they put in their bids just what to count on from their associates on the job by way of help or hindrance to their own work. For instance, if the plumbers are not told in their specifications that the cutting of masonry, iron, wood or plaster work necessary to the proper running of their pipes is to be done for them by the masons, ironworkers, carpenters and plasterers, they will include in their bids a sum to cover the cost of such cutting, and the owner would be paying for it twice, since each of those trades will be called upon in their own specifications to "do all cutting," etc.

So the specification-writer's task is proportionately more complicated. So is the draftsman's. And so of course is the bookkeeper's, whose records show the state of each contractor's account, the extras, credits and payments. When there are fifty accounts connected with one building operation, in place of one, the clerical labor involved is greatly increased; in fact, the importance of accurate business procedure by the architect is apparent.

The pitfalls and labyrinths of misunderstandings into which we may be led through verbal modifications of written contracts, or discrepancies between drawings and specifications, or other vaguenesses, have to be even more carefully avoided when a "general contractor" is not employed. For one of the functions of the latter is to fill up the holes and bridge over the gaps in his contract. These holes and gaps always exist, though their number and size vary according to the thoroughness with which the architect prepares his drawings and specifications, as well as the contract clauses themselves. Among the latter is usually inserted that one which calls upon the contractor to "do any and all other work not shown on or described in plans and specifications, but necessary to complete," etc.

The actual value of this clause depends largely on the good nature of the contractor, as its legal worth is nil. If your "general contractor" is making a good profit out of the work, he will not be averse to filling in gaps and holes out of his own pocket, with a lively sense of favors to come by thus impressing the owner with his liberality. Most contractors figure at the outset on doing this, and their bid for the work is made just so much larger by providing for it.

Under the separate contract system, it is possible to keep a much more accurate account of the building's progress and the proper times and amounts for the payments due the contractors. One reason why contractors like it is that their payments are made to them direct, on the certificate of the architect, whereas when a "general contractor" is in charge, his sub-contractor's work is paid for by him out of the payments made him by the owner. An unfair contractor (there are such persons) is thus given the opportunity to be unfair to his "subs" by holding back their money on some pretext. So the trade contractors welcome dealing directly with the owners, for they know that their payments will be prompt, and at the same time the architect's control is the more effective, for the argument of a withheld certificate is always potent in hastening the carrying out of his directions.

The taking of a large number of estimates by trades, which is so important a feature develops a fact of much significance, but to which little attention is usually paid. This is, the wide difference in the amounts submitted, though the bids are of course all based on exactly the same data of drawings and specifications. Those differences are found to be greater in some trades than in others, but the fact that they *are* found, and almost invariably run a wide gamut of change, is one of the strongest arguments in the trade-contract method's favor.

Various legitimate causes create these differences. One bidder bids low because he is doing other work in the neighborhood of the proposed "job" and counts on consequent economies accruing from that fact. Another counts on certain money-saving methods of which he believes himself master, either in fabricating or erecting material, or both. Still another contractor bids low through a mistake on the part of his estimating clerk in taking off the quantities or adding up the figures. Some contractors are careless enough to entrust this important duty to inexperienced or incompetent hands. A well-known granite firm recently faced, and accepted, a loss of many thousand dollars because it found itself saddled with a contract for stone which the firm's estimating clerk had figured for on the assumption that the architect's drawings were at quarter-inch scale. The drawings were really at eighth-inch scale, and were so marked.

Another case is that of the contractor who, when work is slack, is willing to undertake it at little or no profit to himself in order to keep his men employed. But from whatever cause they are traced, the diversity in the estimates received is nearly always surprising, and emphasizes the importance of taking as many bids as possible in each line, as well as in as many lines as practicable. It often happens that of half-a-dozen estimates taken in a certain trade, the lowest is one hundred per cent less than the highest.

It is hardly necessary to add that a building built under the trade-contract system will be better built than one done under a general contract, for the greater amount of time and attention it demands from the architect is bound to bring this about.

Legal Hints for Architects.—Part III.

BY WILLIAM L. BOWMAN, C. E., LL. B.

MANY of the municipalities to-day have what is known as a Municipal Art Commission, to which commission the plans and specifications for all proposed buildings must be submitted and whose approval must be secured before the building can be erected. The fact that an architect's plans must be approved by such a commission is rarely, if ever, mentioned in the contract, but being a charter requirement is binding upon the architect notwithstanding. While the writer is inclined to feel that such commissions are ordinarily free from political influence, yet that is a consideration which must be taken into account. Then again, such a commission may be dominated by architects who are graduates of the Beaux Arts or members of the American Institute of Architecture or even by local cliques, in which case there may be a prejudice against an architect not associated with the controlling power of the commission. The action of such commissions generally involves merely an approval or disapproval of the plans, and it is often impossible to secure even suggestions from the commission or any of its members as to what features were disapproved or what changes could be made in the plans to make them satisfactory to the commission.

A further requirement binding the architect, but which is not mentioned in the contract, is that his plans must satisfy the Building Department of the municipality, and although it is practically an impossibility to file plans with the Building Department which will be unequivocally approved, yet the grounds for the disapproval are always stated, so that ordinarily it is an easy matter for the architect to make the necessary changes to secure the required approval.

A requirement not stated in the contract is illustrated by the following experience of one architect. By correspondence he offered a certain Lunacy Board "to examine the site and then to prepare all requisite probationary drawings for the approval of the committee, and all other drawings and details to be submitted to the Commissioner of Lunacy, and subsequently to draw the whole of the working drawings and specifications for $2,000." The Board accepted the offer through its clerk and the architect started his work. His first set of plans were disapproved; his second set were rejected as too costly and ornamental; his third set were disapproved, and then the Board decided to engage another architect. By law, the plans had to be approved not only by the committee but by the Court, and when the detailed drawings were completed they had to be approved by the commissioners and finally by the Secretary of State. When the architect sued to recover for the reasonable value of the work which he had actually done, it was held that he could not recover, upon the ground that the architect knew the ordeal through which his plans must go before anything could be done upon them, and he had agreed to receive the gross sum of $2,000 for the perfect and entire work. The Court well expressed the situation in these words: "Does not the plaintiff mean this: 'I, relying upon my skill and experience as an architect and draftsman and upon your judgment and honor, undertake to prepare such plans as you shall approve of, and when you have approved of them and they stand the scrutiny of those other persons to whom the law requires them to be submitted, with such further details as are required, I will then complete my work by preparing the working drawings, estimates and specifications and so entitle myself to the stipulated reward'?" In this same case, the Court, speaking about the question as to whether or not the committee were fair judges of approval, wrote as follows: "If, with full knowledge of the powers and the circumstances under which they were to act the plaintiff (the architect) chose to agree with them that he should not be paid anything for his drawings unless they should be approved by them, I think he ought to be concluded by their judgment."

Counties, boroughs, towns and villages have a common practice of appointing committees who deal with architects when their services are required. Frequently these committees are not careful to ascertain and know the powers which they have been given. Thus they, as well as an architect, often innocently enter into a contract for plans and specifications which the committee had no power to make, and the architect no right to compensation thereunder. For example, a county at one time appointed a committee to investigate and report regarding "the best manner of raising funds," and should submit "recommendations relative to the matter of erecting a Court House," and that the committee file its report in writing, "together with plans and specifications, with the County Clerk, on or before April 1, 1900." The committee after examining many different sets of preliminary plans and specifications finally selected a certain firm of architects to do the work, and entered into a duly written contract for seven sets of plans and specifications and detailed drawings, etc. When an action was later brought to recover for the preparation of plans and specifications pursuant to the contract, it was held that the words "plans and specifications" in the resolution meant *preliminary* plans and specifications, and therefore the contract by the committee for working plans and specifications was beyond their power, and the architect suing upon such illegal and void contract could not recover. In this particular instance there was also an intimation that the architects could not recover for even preliminary plans and specifications because it was understood and a custom for architects to draw preliminary plans and specifications without compensation in the hope of securing the contract for the complete work.

Before closing this subject another usual provision of municipal charters should be mentioned. That is the provision which aims to prevent an officer of a municipality from contracting with the municipality or any of its departments. Thus an architect acting as expert adviser to a municipal Board of Education probably could not at the same time make a contract with the municipality to draw plans and specifications and superintend the construction of a hospital for the Department of Charities. The extremes to which this provision may be

carried are well shown by the following instance: Under the usual Municipal Civil Service rules in vogue to-day, architectural services are graded by such classifications as draftsman, examiner, engineer, inspector, architect, etc., said gradings being made according to the amounts of annual compensation paid. Such architectural positions are subject to competitive examination, thus protecting the successful applicant appointed to a position from being removed for political reasons. Under such employment a man can be granted a leave of absence for a certain length of time, and his name thereupon goes upon a list of those eligible for similar positions throughout the municipality. Such were the conditions in a city where an architect assumed to take advantage of a granted leave of absence in order to enable himself during the leave of absence to take a contract with the city to draw plans and specifications and superintend the construction of a Court House. After he had spent nearly $10,000 in the way of expert advice, draftsmen, materials, surveys, etc., and prepared not only preliminary plans and specifications, which were duly approved by the proper official, but almost completed the final plans and specifications, he was refused compensation for any of the said work. Upon suit brought upon a proper written contract, there having been a previous appropriation, the architect was defeated, practically upon the sole ground that while he was upon the eligible list of the Municipal Civil Service, he was still in the employ of the city, even though receiving no compensation therefrom. His name being upon said eligible list brought him within the restrictions of the charter provision hereinbefore mentioned.

The above considerations regarding municipal work are sufficient to show the dangers of such service. The writer's experience urges him to recommend that no architect should attempt to secure or perform a municipal contract without a full appreciation of its dangers, especially in view of the fact that practically every change in political power brings opposition and added difficulties. To sum the situation, the architect is dealing ordinarily not only with the now familiar political steam roller, but with a city attorney whose assistants for political exigencies and for reputation look for every technicality and excuse to prevent the payment of money out of the corporation treasury; in other words, to prevent one case of graft and fraud the legal staff of the municipality will dispute and defeat ninety-nine fair, legal or equitable claims for work actually done or time and expenses honestly and in good faith expended in behalf of the municipality. As a final warning, this class of contract is strictly within the rule that a little knowledge is a dangerous thing, and about the only recommendation that can be honestly and fairly made is that no step should be taken in such matters without taking local legal advice.

(4) The various states of the Union and the United States Government have requirements regarding contracts much similar to the requirements of the municipal corporations. A very brief consideration of the United States statutes regarding this matter will show the general trend of such requirements and their interpretation. The aim, object and intention of the government to preclude fraud or favoritism finds expression in a statute which provides that all purchases and contracts for supplies or services in any department of the Government, except for personal services, shall be made by advertising, etc. There is no question but what the exception would cover the usual case of the employment of an architect. In this connection it is gratifying to notice that there is no strict technical application of this law, and there are many instances where this requirement is dispensed with under unfavorable or peculiar circumstances, and it is still more gratifying to note and record that even though such a contract is declared void for failure to advertise, yet if the supplies or the services have been received by the Government and it has derived the benefit from the same, recovery is always permitted; not, however, upon the contract, but upon the *quantum meruit*, or for the reasonable value. Again, there are statutes designed to prevent officers from contracting unless there has been a previous appropriation, and that no contract is binding for a larger sum than the amount of the appropriation. Yet these statutes are not strictly construed and there are certain officials to whom they are not applied, and such laws are never permitted to defeat recovery for work, labor or services honestly and fairly performed, the results of which have been beneficial to the Government.

There are further requirements that members of Congress must not be interested in Government contracts. Probably one of the most important statutes provides that every contract with certain of the Government departments is required to be in writing and signed by the parties. This statute is in the nature of a Statute of Frauds to protect the Government. In the interpretation of this law the Comptroller of the Treasury and the Court of Claims have consistently held that the invalidity of a contract by reason of this requirement is immaterial if the contract has been performed. Thus it will be seen that the rulings of the Comptroller of the Treasury upon questions of payment, in cases where the strict letter of the statutes has not been followed, are based upon equitable principles.

Since a sovereign power can not be sued in the courts of law, the states and the United States have formed Courts of Claims where any claimant against them may prove his case, and his right to compensation is there governed by equitable rules. One illustration will show the difference between the usual Trial Court justice and the treatment accorded by a Court of Claims.

The Assistant Secretary of the Navy directed a naval officer to have drawings and plans made for changes at Annapolis. Said officer employed an architect upon an agreement that the architect was to charge nothing for the plans, provided he was engaged to superintend the construction, for which superintendence he would receive the usual compensation. The plans were completed after several months' work, were duly approved by the naval officer, and then sent to the Navy Department at Washington, but that was the last heard of them or of the proposed work. Upon claim being filed and the evidence taken, the Court permitted the architect to recover the reasonable value of the work done.

This shows that while an architect should not knowingly violate any of the statute requirements prescribed by a state or the United States, yet if such requirements are innocently and unknowingly violated, yet the archi-

tect has a chance of recovering the reasonable value of the work which he has done.

(5) Competitions are of course the convenient and usual method of securing plans and specifications for large buildings. The invitation to compete contains the conditions, which are usually strictly enforced. The familiar condition granting the right to reject any or all plans has caused much trouble. Again here, as in contracts with municipalities, the architect must be absolutely certain that he has followed and conformed to each and every requirement of the conditions of the invitation; otherwise he may be defeated upon a technicality by some unsuccessful competitor, or unfair or biased board or committee.

In one case there was the invitation to compete containing the condition above mentioned, and the architect in question with others duly presented plans. The Building Committee passed a resolution stating among other things that "a vote of the committee be taken as to which plan best meets the letter of the requirements and the needs of the association, and that on completion of this examination we select the architect who has the largest number of votes." At the next meeting it was found that architect A had the largest number of votes. The committee then formally rejected all plans and ordered them returned. Then they passed a vote choosing A as architect "in accordance with the vote of last night," and he was unofficially notified by a couple of the committeemen of his appointment. About forty days later the same committee met and rescinded their action. A day or so later the architect wrote to the Board claiming to act as architect. They refused to permit him so to act and upon suit being brought the Court held that there was no contract because the vote was not an offer or proposal to him.

In still another case the condition in the resolution which adopted the plaintiff's plans after competition was "that after duly advertising for bids and for the construction, etc., we receive a bid from a reliable party who will enter into a good and sufficient bond, etc." The Board of Supervisors who had charge of this matter later thought that the architect had slandered them, so they passed a resolution rejecting the plans, even although a bid had been duly received from a party ready to furnish a good and sufficient bond. The Board took the ground that this condition required an acceptance by them of the bid before the plaintiff should become architect, but the Court held strictly to the wording of the condition that there was no necessity for the acceptance of the bid, the only question being whether the bid was from a reliable party willing to give a good and sufficient bond.

Probably one of the most palpable attempts to defeat an architect in his rights acquired by competition involved the following facts: The terms of the competition called for two buildings, a County Court House and a County Jail, with a limit of expenditure of $150,000. Among the conditions were the right to reject any and all plans; that the architect submitting the accepted design should receive the commission for drawing of all plans and supervision of the work; the Board reserved the right to alter or amend any plan accepted; the names of the authors were to be put in sealed envelopes, to be opened only after the award and in the presence of the Board and a jury; that the Board of Supervisors with expert advisers would form the jury of award; that the jury would use discretion as to any violation of the terms of competition and their judgment would be final; that a prize of $250 would be paid for each of the three best designs submitted, exclusive of the accepted design. About fifty different sets of plans were received and they were put upon exhibition to the taxpayers, and finally the Board passed a resolution which, while it recited that it was inadvisable for the county to expend more than $100,000 in the erection of the county buildings, and that it was obvious that the plans submitted called for an expenditure in excess of that amount, yet that one certain plan best met the requirements of the county in the opinion of the Board, therefore the Board resolved pursuant to the terms of the competition to award the first place of merit to that plan, subject to the condition that the author modify the details in certain ways and in a manner satisfactory to the Board. A copy of this resolution was then sent the successful architect. Several months later the Board passed a resolution repealing said resolution and then passed a resolution reopening the entire competition and requesting all competitors to return and file their plans for reconsideration. Later the Board appointed a jury of expert advisers to pass upon the plans. The Board and the jury finally came to an agreement and selected another architect's plans, but the Board in passing its resolution merely recited all the facts and stated that in view of the fact that the cost should be reduced to $100,000, the Board desired to have the architect who won the first competition and the architect selected under the second competition both alter their plans to conform to the cost of construction desired. In the meantime the architect named in the first competition had never received the notice about the second competition and had not personally put his plans in the second competition, contending that under the first resolution he was entitled to be architect. Pursuant to their request he did make changes in his plans to reduce them to the $100,000 cost, stating, however, that he did so in pursuance with the first resolution naming him as architect. Later on the Board, after having received estimates from builders, all of which were high, rejected all plans. Within a month after said rejection the Board then proceeded to award a contract to the architect named under the second competition. Upon suit being brought the Court held that the terms of competition were an offer, and the plaintiff having complied with said terms and conditions and the Board having passed a resolution setting forth said compliance and naming said architect as the winner, that should be considered as making a binding contract that the plaintiff be employed as architect for the building, so that the reduction of his plans to a cost of $100,000 instead of $150,000, as proposed in the competition, was not a condition precedent to his right to become architect. Of course throughout this procedure the county was advised by its attorneys, and the methods used in the attempt to defeat the architect's rights in this instance were well calculated to defeat not only his legal but also his equitable rights. Again, the only advice which can be given is that when you intend to enter a competition submit its terms to your attorney, and if successful follow his counsel until you have collected your full fee.

FIRST BANK BUILDING.

DETAIL OF FIRST BANK BUILDING.

DETAIL OF GATEWAY TO TOWN.

ILLUSTRATIONS OF THE NEW TOWN OF COREY, ALABAMA.
William Leslie Welton, Architect.

Plate Illustrations—Description.

THE UNITED ILLUMINATING COMPANY BUILDING, NEW HAVEN, CONN. PLATE 113. The exterior is of "Tapestry" brick of a buff color with wide, deep raked joints, laid in the first story with double stretchers and in the second story and battlement with a diaper pattern of 2-inch, square gray heads with a single blue head in center. The trimmings throughout are of cream color, mat glazed terra cotta, with all decorative work, enrichments, cornices, etc., in green and gold. The exterior woodwork is of mahogany with bronze grilles and bronze lamps. The main room on the first floor is finished with a marble and tile floor, marble wainscots and counters, mahogany trim throughout and a beamed ceiling. In the second story the president's, the directors' and the general offices have finish and wainscots in mahogany, mantels in mahogany and marble, wall brackets and ceiling chandeliers finished in silver. The color scheme is also in buff and cream. The building is heated by direct steam. The approximate cost of the building is $40,000. The cubic contents measured over all from roof to cellar floor is approximately 145,000 cubic feet, which gives the rate per cubic foot approximately 28 cents.

SPRINGFIELD GAS LIGHT COMPANY BUILDING, SPRINGFIELD, MASS. PLATES 114, 115. The exterior is of New England red water-struck brick, laid in white cement with ½ inch joint. The trimmings are of Indiana limestone. The center of the building is two stories high with skylight above. The woodwork is painted white while the walls and ironwork are in varying tones of gray. The approximate cost of the building was $80,000.

PRICE HILL PUBLIC LIBRARY, CINCINNATI, OHIO. PLATE 116. This building forms a part of Cincinnati's Park Scheme and will eventually have the parking, such as shrubberies, etc., which will give it a proper setting. The approximate cost of the building was $21,500, and the cost per cubic foot, 16.7 cents. This measurement was taken from basement floor to height of roof.

DIVOLL BRANCH LIBRARY, ST. LOUIS, MO. PLATE 117. The exterior is of a rough matt brick, cherry red in color and laid in white mortar. The stone, excepting the base course and steps of granite, is of buff Bedford. The main reading room on the first floor is approximately 98 feet long by 44 feet wide, with a clear ceiling height of 21 feet. The walls are lined with book shelves to the height of 7 feet 6 inches. The building is fireproof, and steel trusses carry the roof which is covered with slate. The interior finish of the building throughout is of white quartered oak. The building contains 231,300 cubic feet, and the cost complete, including decoration, fixtures, shelving, furniture and equipment of every kind and landscape gardening, was $70,548, or 30½ cents per cubic foot. Exclusive of the items just mentioned, the cost per cubic foot was 25½ cents.

AMERICAN PAVILION, ROME, ITALY. PLATES 118–120. Each nation participating in the World's Fair at Rome, Italy, was asked to erect a pavilion characteristic of their own life which would furnish a type of country home, livable and homelike. An effort was made by the architects to have the United States pavilion conform in every way to the wishes of the committee in charge. The greatest problem in the design was to adopt the requirements of an art gallery with overhead lighting to a building in which the window openings were to be one of the essential features. It was possible to construct the main façade facing the formal garden with such openings as were required by running a portico and entries across the entire front. The building is absolutely fireproof, and practically the only wood in the building, excepting doors and trim, is the ⅞ by 3 inch wooden strips bedded on the face of all columns and ribs to which are attached the 2 by 2 inch picture strips built into the walls and covered with metal lath and plaster. The roof construction is formed entirely of steel, which carries a tile covering and the upper and inner skylights. To insure a building which would be in every sense American, arrangements were made whereby the manufacturers of "Tapestry" brick supplied and shipped to Rome the entire facing, or veneer of brick, which was laid up in special design and pattern. The arrangement of color and pattern has made the American Pavilion one of the most talked-of buildings in the Exposition. The "Tapestry" brick attracted the special notice of the King and Queen who commented favorably upon their texture and beauty. The dull red appearance which confronts one in approaching is restful and presents a decided contrast to the white walls of the surrounding buildings.

THE LAW BUILDING, UNIVERSITY OF VIRGINIA. PLATE 123. This structure is the latest addition to the facilities of the University of Virginia, the institution whose original buildings were designed by Thomas Jefferson. The building follows the general proportions and character of the original buildings both in its design and materials of construction. The general wall surface is of a dark red brick, the columns of brick stuccoed and the cornice of wood, white. The part of the first floor over the boiler room is fireproof and the rest of the building is of the usual wood and brick construction. The cost of the structure was approximately $60,000.

ENGINEERING BUILDING, RUTGERS COLLEGE. PLATE 124. The architects in designing this building endeavored to preserve the style and feeling of the old "Queens College," as well as conform to the varied styles of the modern buildings. The exterior is of brick and terra cotta. The brick are of a soft red with chrome tones running through, interspersed here and there with patterns, diapered work and Moravian tiles. The terra cotta is of a warm color with a fire flash that makes it blend with the general tone of the brickwork. The back portion of the basement being entirely above ground is utilized for the dynamo laboratory and for the mechanical engineering laboratory. The roof is of slate. The cupola acts as a plenum chamber for the ventilating system. The heating of the building is so arranged that it can be controlled as a whole or in part from the basement by the arrangement of valves. The building is entirely fire-proof, with the exception of the finished floors which are of wood. The structure was built at a cost per cubic foot of 18.3 cents.

Editorial Comment and Miscellany.

THE LONDON MEMORIAL TO KING EDWARD.

THE sight proposed for the King Edward Memorial in London is in the Mall, directly opposite Marlborough House, and the scheme includes, besides a bronze statue of the King, the demolition of the present bridge across the lake in St. James's Park and the erection of a more ornamental bridge, to which King Edward's name will probably be given. The King and Queen Alexandra have approved of the site. The sculptor selected by the committee for the work is Mr. Bertram Mackennal, A. R. A. He contemplates illustrating the great aim of King Edward's reign by erecting a large seated figure of Peace, with appropriate symbols. On each side of the super-base will be two processional groups, comprising eight or nine figures delineating the "Arts of Peace" and advancing towards the central figure. On the super-base will be erected a center pedestal, on which a bronze statue of King Edward in Garter robes — 14 feet high — will be placed. The height of the entire memorial will be from 45 feet to 50 feet. At the back of the pedestal, facing the park, a figure of Britannia will balance that of Peace. A flight of steps will connect the memorial on the park side with the avenue between it and the bridge. Mr. Edward Lutyens is the architect selected to design and carry out the bridge and other features of the scheme, which will include paved terraces, with balustrades, vases and stone seats. The estimated cost of the central monument is $150,000 and of the bridge $100,000. The time suggested for the completion of the work is five years.

DETAIL BY SCHWARTZ & GROSS, ARCHITECTS.
South Amboy Terra Cotta Company, Makers.

DETAIL BY FREDERICK C. BROWNE, ARCHITECT.
Executed by the New York Architectural Terra Cotta Company.

BUILDING CONSTRUCTION IN CHINA.

THE sum of over $6,000,000 spent by China last year on the purchase of foreign building materials is indicative of a far-reaching change which is coming over the habits of the Chinese people. The dilapidated rows of one-storied houses of lath and plaster, which formerly did duty as Government offices, schools, barracks, etc., are rapidly disappearing before buildings in foreign style of brick and stone, fitted with electric light and steam heat; while in all the large cities and trading centers, merchants and shopkeepers are replacing the shanties of former days with modern constructions, in which the yanglou, or foreign upper story, and the plate-glass window are usually conspicuous features. In places like Shanghai and Peking, where the erection of business buildings and Government offices has been entrusted to foreign architects, the results have the character of a European city. As regards such materials as stone and brick, China is already well supplied.

JAPANESE GARDENS, GREAT NECK, L. I.

A NEW motor-boat canal is being cut from a point in the bay opposite the Manhasset Yacht Club to a distance of more than a mile. The canal is to be 200 feet wide and to have a depth of 10 feet at low tide. A frontage of 800 feet on the canal is to be filled in and laid out as a Japanese garden. The plans for the garden comprise the erection of a casino of pure Japanese design. A salt water swimming pool and bathing beach will connect the casino with the tennis courts and a bathhouse of harmonious design. A picturesque Japanese bridge will span a brook springing from the hills, which will be fashioned into miniature lakes and waterfalls.

TERRA COTTA TILE FOR PARTITION WALLS.

THE illustration on page 199 of one of the offices of the West Publishing Company,

DETAIL BY CHARLES B. MEYERS, ARCHITECT.
Executed by the New Jersey Terra Cotta Company.

St. Paul, shows the walls built of interlocking terra cotta tiles. While only one room is shown, all the offices of the company are finished in a similar manner. The illustration gives no idea of the beautiful tone effects in this tile. The center of each is flashed with a delicate old rose tint shading to an old gold at the edges. The tiles are laid with a light cream joint and the whole covered with three coats of transparent varnish, which imparts to the walls the soft mellow glow of the setting sun.

DETAILS, ST. PATRICK'S CHURCH, BROCKTON, MASS.
Executed in terra cotta by the Atlantic Terra Cotta Company.
Charles R. Greco, Architect.

Besides their beauty these tiles are comparatively inexpensive, sanitary and fireproof, and are particularly adapted for partition walls in office and other semi-public and public buildings. They are made by the Twin City Brick Company, St. Paul.

HORACE'S SABINE FARM.

THE announcement is made of the discovery of the Sabine Farm at Vignati-Corte, near Licenza. Excavations reveal primitive wall panels and a mosaic pavement of the Augustan epoch. In front of the dwelling portion of the house was a garden of considerable size surrounded with arcades. In the middle of the garden a basin or pool has been uncovered more than 60 feet in length. To the left of the enclosed garden the ruins of a large farmhouse are to be seen. A frigidarium, a large basin, and the corresponding calidarium have also been revealed. Every feature of the interior gives the impression that it was once rich in statuary and mural paintings, and a large number of artistic fragments have already been found.

OFFICE OF THE WEST PUBLISHING COMPANY, ST. PAUL, MINN.

NEW TOWN OF COREY, ALA.

THIS model industrial town, near Birmingham, Ala., is being built for the purpose of housing the many employees which will be engaged on the construction and in the operation of the ten million dollar improvements now going on under the direction of the United States Steel Corporation. As indicated in the illustrations (see page 196) brick with panels of cement and tile will be used for all houses, commercial and other buildings to be erected. William Leslie Welton, Birmingham, has been chosen architect for the entire group, and the brick, which is of various shades from light to dark buff with fire-flashed tones of brown, red and black, is made by the Sibley-Menge Brick Company.

ON THE Fourth of July, 1912, will be dedicated the monument commemorating the battleship "Maine." The shaft is the work of Atilio Piccirilli, sculptor, and will furnish with its elaborate setting a monumental

entrance to Central Park, New York City. H. Van Buren Magonigle has charge of the landscape features.

CHICAGO DOCK IMPROVEMENTS.

THE city of Chicago is considering plans already made under the supervision of the Administration for a new system of dockage. The scheme provides for a harbor with twenty-five miles of docks, including boat landings for freight and passenger traffic, piers for yachts and excursion steamers, teaming platforms, traffic and pleasure driveways, recreation piers, etc.

HOUSE AT WESTWOOD, OHIO.
Roofed with American "S" tile.
Samuel Hannaford & Sons, Architects.

GOVERNMENT-MADE bricks will be used in the new capital buildings to be built at Canberra, Australia. The discovery within the new federal area of promising deposits of raw material has led the Government to the conclusion that the establishment of a brick-making plant on the property would be highly profitable.

NEW BOOKS.

Official Year Book of the New York Society of Architects. A handbook containing the information required in the daily routine of an architect's office. New York; A. M. Madigan, publisher.

DETAIL BY PEUCKERT & WUNDER, ARCHITECTS.
Executed by the O. W. Ketcham Terra Cotta Works.

Tuberculosis Hospital and Sanatorium Construction. Written by Thomas Spees Carrington, M.D., for The National Association for the Study and Prevention of Tuberculosis. The book contains 168 pages, bound in heavy paper and published by the Association, 105 East 22d street, New York. Price, 25 cents.

The Principles of Planning Buildings. Percy L. Marks, architect. An analytical treatise containing over two hundred plans of buildings of various types. New York, William Helburn, publisher. Large 8vo, cloth, gilt. Price, $4.80.

Plumbing and Household Sanitation. Edited by J. Pickering Putnam. A course of lectures on "Plumbing" delivered before the plumbing school of the North End Union, Boston. New York, Doubleday, Page & Company.

Fire and Fire Losses. A paper by F. W. Fitzpatrick on the causes of fire, the means to prevent them and the fire resisting construction of buildings. Chicago, American School of Correspondence.

Annual Report of the Boston Schoolhouse Department, 1910–1911. Report of the Commissioners on the various divisions of schoolhouse work. Boston, City Printing Department.

Our Home City. Edited by William Arthur on the Model City and its various needs, Omaha, Neb. William Arthur, publisher. Price, 25 cents.

IN GENERAL.

The Conkling-Armstrong Company supplied the terra cotta for the United Illuminating Company's Building, New Haven, Conn., Foote & Townsend, architects, illustrated in this issue.

The Engineering Building at Rutgers College, Hill & Stout, architects, illustrated in this issue, was built of Sayre & Fisher brick.

DETAIL BY LONG, LAMOREAUX & LONG, ARCHITECTS.
American Terra Cotta & Ceramic Co., Makers.

Brick for the Divoll Branch Library, St. Louis, Mo., Mariner & La Beaume, architects, illustrated in the Plate Forms of this issue, was furnished by the Hydraulic-Press Brick Company.

The Newton Y. M. C. A. Building, Brainerd & Leeds, architects, shown on Plate 102 of our August issue, has its entire exterior walls waterproofed by Cabot's Colorless Waterproofing Number 700.

The following buildings illustrated in the Plate Forms of this number are built of "Tapestry" brick, furnished by Fiske & Co., Inc.: American Pavilion, Rome, Italy, Carrère & Hastings, architects; United Illuminating Company Building, New Haven, Conn., Foote & Townsend, architects; Nichols School Building, Buffalo, N. Y., Green & Wicks, architects.

DETAIL BY ALBERT KAHN, ARCHITECT.
Executed by Conkling-Armstrong Terra Cotta Company.

John H. Pray & Sons Co. have published recently a small book relative to the merits of their linoleum and cork carpets. It also enumerates the large number of buildings in which this material has been used with unmeasured success.

The program for the Ninth International Congress of Architects, to be held in Rome during the month of October, under the patronage of His Majesty the King of Italy, can be obtained by addressing George Oakley Totten, Jr., Secretary and Treasurer, American Section, Washington, D. C. It summarizes the various meetings, the numerous excursions in the neighborhood of Rome, the method of traveling, the hotels, etc.

DETAIL BY JARVIS HUNT, ARCHITECT.
Executed by The Northwestern Terra Cotta Company.

THE BRICKBUILDER

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LETTERPRESS

CHURCH OF SAN CRISTOBAL,
PUEBLA, MEXICO.

Dome is covered with glazed tile forming squares of yellow and blue. The ribs are blue and the star is yellow on a blue ground.

THE BRICKBUILDER

OCTOBER, 1911

VOLUME XX. NUMBER 10.

Architects in Charge of Construction.

H. KENT DAY.

THE article by Mr. Walter B. Chambers, "Architects in Charge of Construction," published in THE BRICKBUILDER for August, gives so complete a description of the system that it seems best that anything further on the subject should assume the form of comments supplemental thereto.

It is doubtful whether the term "Trades-Contract Method" is the best for the purpose. It would be better to emphasize the *separation* of the usual general contract into many, rather than to call them "trade-contracts"; therefore the term "Separate Contract System," which is frequently if not generally used, expresses the essential idea more strongly.

One of the most important advantages in the separate contract system not mentioned by Mr. Chambers is that the architect actually *controls the selection* of the sub-contractors. No matter how many bidders he may ask in any one trade, it may be supposed that he will apply only to those who would be satisfactory to him as contractors and whose bid he would accept if lowest. Thus in advance he knows that his list of contractors, as far as can be foreseen, will be such as he would desire. In the general contract system, bids are often asked even by good well-meaning general contractors from low bidding sub-contractors, and it is seldom that the lowest general bidder presents a list which is wholly satisfactory. Should the architect wish to substitute others who do meet with his approval, the bid is necessarily advanced, perhaps beyond that of the next highest bidder, whose list in turn would probably contain objectionable names.

It is because the separate method provides, as shown, presumably only good men for the various trades that there is more direct and better control of the work, rather than on account of avoiding what Mr. Chambers calls the "Military System." While it does occur occasionally that a sub-contractor refuses to take orders or suggestions from the architect unless through the general contractor, this gives little trouble compared with the frequent necessity of accepting unsatisfactory or incompetent men as sub-contractors, often those whose habits of workmanship, no matter how willing they may be, prevent their carrying out their contracts as demanded by the specifications and by the architect. Incompetent sub-contractors are met with more frequently than disobliging ones, but by the separate contract system there is a reasonable surety of avoiding both.

Mr. Chambers mentions the saving of the general contractor's profit on the total of the sub-contracts, but the advantage to the owner through closer bidding under the separate contract system deserves fuller explanation. Under a general contractor in an operation where there are, say, twenty-five separate parts of the work, at least one hundred and twenty-five bids would be asked. Each general contractor is furnished by the architect with a set of the blue prints and a copy of the specifications. The result is that in a more or less cramped and unsuited office there are often seen a great number of men at one time (for they seldom begin to make up their estimate until the last days of the time allowed) endeavoring to learn what work they have to do or what materials to furnish, all needing the specifications and certain prints at the same time and necessarily guessing, more or less, at the cost or quantity and, naturally, not in the owner's favor.

The difference of opportunity and certainty in bidding in the separate contract system is marked. As stated by Mr. Chambers a much larger number of copies of drawings and specifications are required. Each of the, say, one hundred and twenty-five bidders receives as nearly a complete set of drawings and copy of the specifications as he may have any reason for consulting. The work of some bidders may have a relation to twelve or more parts of the work. These men must have all those parts of the specifications sent to them with whatever part, or the whole if necessary, of the blue prints. Thus the total number of prints and specifications distributed may be very large, yet there must be no economy in regard to this. Each man must be allowed ample time, from one week to ten days, to examine everything having any bearing upon his bid. This he is enabled to do at his own office or home, and with the advantages afforded him he is more likely to commence to compute soon after receiving the documents. He realizes he is in a real

competition, equally fair to all, and he will proceed to obtain the best bids possible on his materials, apparatus, etc. He now has no reason for guessing, he can get his costs accurately on even the smallest items of labor or material.

Mr. Chambers gives as a reason why contractors like this system, that the payments are made direct by the owner, and explains clearly why this is an advantage, but he fails to make the point that this is a strong reason for low bidding. Many contractors state freely that they bid lower under a contract direct with the owner than they will to a general contractor. It is often stated that this difference is five per cent or more. It must be remembered that in bidding to several general contractors, they do not know which will be the lowest and they have to take the risk of becoming sub-contractors to an undesirable contractor, whereas the owner's financial responsibility is or may be known in advance and is generally better than that of the average contractor. It is not difficult, therefore, to see the advantages to the owner in this method of getting the bids under the separate contract system.

As to the various contractors under this system who would otherwise be sub-contractors, it may be freely stated that invariably they greatly prefer this method. In addition to the advantage to them that they are paid directly by the owner and that they can know in advance what his responsibility is, they are interested in the work and they come into immediate contact with the architect whom they find directly interested in their work. They are not separated from him by one who is a mere broker of their services. They realize that they are having a fair chance to do their best, and they do it. They become keen for re-employment under the same system.

As to owners, it is the experience of those architects who have adopted this method that when an owner has had even a single opportunity of observing its workings, he would not willingly go back to the general contract system. An interesting instance is where an owner who was familiar with the separate system, having occasion to have some large work done by an architect other than the one usually employed by him, insisted that the work be done by the separate system even though the architect was unfamiliar with it.

Mr. Chambers omits an important point — possibly he thought it went without saying — that the architect should have a greater commission for doing the work under this system. As the owner will make very considerable savings through direct bidding and by the saving of the general contractor's profits on sub-contracts, he will have, after paying the architect a suitable fee for the additional work and expense entailed, a substantial balance in money in his favor aside from all the advantages inherent in this method. It is not meant that the owner should pay a larger fee because he — the owner — makes substantial savings, but because of the added work and responsibility devolving upon the architect. Some of the reasons for such added work and expense may be noted:

Drawings must be more numerous and more carefully made and fuller in their demonstration of the work.

Specifications must be more accurately divided as to trades; and more complete and detailed.

The bidding in detail becomes a part of the duties of the architect.

There are many contracts to write and to have executed in place of one.

Supervision is far different, combining much usually done by the general contractor and much that he often fails to do.

Book-keeping must be separate and accurate for each account from start to finish.

Responsibility of the architect is far greater in many respects.

Payments are made monthly to many contractors instead of to one. The architect must issue a separate certificate to each contractor after careful investigation and, if necessary, correction of the claims of each.

It is more important than with work done in the usual way that the one or more superintendents should be not only capable persons but especially suited by experience and temperament for carrying on the work under separate contracts and attending to the various additional duties which are theirs under this system. It is their duty to see that the work of the various contractors is done in the proper sequence, that there are sufficient and properly skilled men furnished by each contractor at the proper times, to know in advance the condition of the work in the shops or yards and many other duties which are, under the ordinary method, those of the contractor and his assistants.

In regard to the "gaps and holes" that Mr. Chambers says have to be filled under the general contract system, most contractors figure on these and include in their bids what may be called a "contingent fund." If, however, there are no gaps or holes or only a few, the contractor gets his allowance in full and the owner is correspondingly the loser. Moreover, the theory that he will fill the gaps when he has made a contingent allowance is not borne out by the facts, for when no sub-contractor can be called upon under the specifications, the general contractor will nearly always demand an extra, as it is not known that he has allowed for gaps in his contract price. He makes such allowance to cover himself, but it is not usually used for the owner's benefit if an extra can be obtained. In the separate contract system, the greater care needed in preparing the drawings and specifications for bidding under distinct headings makes gaps and holes less likely to occur — the owner paying only what it costs to take care of them and never paying twice. Again, guessing and the consequent loss to the owner thereby is eliminated.

In conclusion it may be said that the separate contract system is not generally applicable with advantage to small operations. While it would be of advantage to the owner to adopt the system for work of any size, it is doubtful whether, with any reasonable payment, the architect can employ it without loss on buildings costing less than $75,000 to $100,000.

What has been said above about general contractors and their methods of handling contracts must not be taken as applied to all alike. There are many who do take an interest in the work other than that of a broker and who do not exact an extra wherever possible. If all were of this kind, there would be little need of the separate contract system.

Legal Hints for Architects.—Part IV.

WILLIAM L. BOWMAN, C. E., LL. B.

DURING EMPLOYMENT.

Duty to Employer. The failure of architects generally to have a formal written contract of employment has just called forth the following judicial plea: "When parties fail to reduce their contracts to writing and cannot agree upon the terms thereof, it is difficult for courts to determine with legal accuracy the liability of the contracting parties." Such failure necessarily leaves the architect's duties undefined, and as a practical matter the same might be said of most of the architects' written contracts. Those duties are threefold, namely, to his employer, to the contractor thereafter employed, and to himself. They are largely determined by the architect's contract of hiring, and by the terms of the construction contract entered into by the owner, but they also depend somewhat upon the practice of the profession as established by custom and good usage in the various localities. An architect, like any other professional man, impliedly contracts with his employer (who will for convenience hereafter often be designated as the owner) that he has the ordinary skill, knowledge, and judgment possessed by men of his profession, and that he will use this skill, care, and judgment in the interest of his employer and will act with perfect honesty. There is also an implied understanding upon the employment of an architect that the work shall be suitable and capable of being used for the purpose for which it is intended. The basic principle of the relationship between employer and architect has been concisely stated in these words: "Architecture is the art of building according to certain determined rules. The owner does not know the rules. He employs an architect, who makes the plans in accordance with them." In addition to his knowledge of the fundamental laws of nature, of materials, etc., an architect represents himself as possessed of a knowledge of the statutes, ordinances, and laws relating to buildings and to the erection of buildings in the places where the structure is to be located.

As to the amount of skill required, his undertaking implies that he possesses skill and ability, including taste, sufficient to enable him to perform the required services, at least ordinarily and reasonably well, and the mere fact that others of far greater experience or ability might have used a greater degree of these elements is not sufficient to make him responsible for failures or mistakes in matters of reasonable doubt and uncertainty. Unless there is a special contract providing therefor, an architect does not warrant the perfection of his plans, nor of the structure, nor its safety, nor that it is durable, any more than a surgeon warrants a cure or a lawyer guarantees the winning of a case. The question is whether there has been such a want of competent care and skill leading to a bad result as to amount to negligence. Thus, one who takes a contract to plan a million dollar court-house has been held by the law to a higher degree of skill than one employed to plan a country home, or, as it has been judicially expressed, the skill and care must be commensurate with the undertaking to be performed. The liability of an architect for failure to possess or apply these qualifications will be hereinafter considered under that heading.

One of the early duties of an architect is to obtain from the owner all facts necessary to enable him to prepare proper plans and specifications for the proposed building. Another duty is to submit studies, sketches, or preliminary plans for approval, which should conform to the instructions given by the owner, especially as to the estimated cost. Said sketches or preliminary plans should also comply with all laws applicable, they should not infringe the rights of any third party, and should be in accordance with all the rules of the architect's science and art. How many different sketches or studies shall be submitted upon request depends upon the contract requirement. If nothing is mentioned regarding the same, then the number depends largely upon the importance and magnitude of the proposed construction. If the architect has confirmed his employment by writing, as has been suggested should always be done, and at the same time referred to and enclosed the schedule of the American Institute of Architects, so that its terms and conditions are brought to the notice of the employer, then the number of sketches would probably be governed by said schedule. Ordinarily this is not a matter of serious import, except in cases where the employment is discontinued after such studies or preliminary plans have been prepared and submitted. Whether recovery will be permitted for more than one set of sketches or plans depends largely upon the facts, but it involves the same principles as where more than one set of detailed plans and specifications are drawn, consideration of which is taken up later.

An architect upon presentation and explanation of the sketches or preliminary plans to his employer is often directed to make certain changes, and frequently such changes increase the cost. In such instances an architect, for his own protection, should always advise his employer of this fact in writing even though such a statement may seem senseless or unnecessary. In municipal contracts or in contracts where the architect knows that only a certain amount is available with which to construct the building, this matter of making changes becomes extremely serious. While an architect is ordinarily bound to obey the instructions and directions of the contracting official who represents his employer, yet if in so doing the cost is being increased over the appropriation, it is proper for him to refuse to make the changes without corresponding cost-reducing modifications. The only other safe method is to offer to make the changes provided the official will give his personal written agreement to pay for all services rendered if the plans should be rejected or compensation refused for that reason.

After approval of the studies or sketches, then it is the

architect's duty to furnish detailed plans and specifications conforming with the requirements heretofore mentioned for the preliminary plans. In this connection it might be noted that it has been held that blueprints furnished are sufficient to comply with the contract to furnish plans. On the other hand, it has been held that where the architect failed to include among his drawings a transverse section, and where the specifications were general as to concrete work, electric wiring, etc., he had not fulfilled his contract, the intimation being that the specifications for the construction contract *must* be definite.

This brings us to one of the most frequent causes of the trouble between owners, architects, and contractors; namely, the inability of some architects to express their requirements clearly, concisely, and in plain unequivocal English so that all concerned may read and know what their specifications mean and call for. Most of this trouble can be ascribed to the practice of copying specification provisions from some other person's work or from some ancient specifications with no regard or consideration as to whether the class of materials is the present market classification, or whether even obtainable except at an exorbitant price. Such specifications usually contain ambiguous phrases which have been rightly named "club or big stick clauses," unfair to all parties and which create the impression that the architect himself does not know what he wants, and that he expects to cover up his deficiency by other common phrases such as "the decision of the architect as to the true construction and meaning of the drawings and specifications shall be final"; "that all work and materials must be to the entire satisfaction of the architect"; "that all materials must be of the best quality"; "that all work must be done in the best manner as the architect shall direct," etc. Nor do these expressions always accomplish the expected result. For example, where a contract for a heating plant provided for "a complete and perfect job, even though every item required to make it such is not specially noted in the drawings or these specifications"; also that the contractor "shall furnish all labor, tools, and appliances necessary to complete his work according to these specifications, and shall perform his work in a true workmanlike manner in every particular, and thus provide the building with a durable and mechanically perfect system"; it was held that the contractor was not required to improve upon the plans in order to make a mechanically perfect system.

Similarly, where a contract requires the construction of a cellar according to specifications, it was held that an additional requirement that "the whole to be perfectly water-tight and guaranteed" only bound the contractor so far as his own work was concerned and that he was not held to guarantee that the plans would produce a water-tight job. In another instance, where a tin roof of the "best quality" was called for, the trial justice in charging the jury held that such a requirement was satisfied when the roof as finished "was equal to the standard contemplated by the contract." In another contract a reservoir was required to be built according to definite plans and specifications, and the contract further provided that "the work contemplated . . . is the construction of a water-tight reservoir," and it was held that that did not impose upon the contractors the responsibility of making the reservoir water-tight, because consideration of the entire terms of the contract showed that they had no discretion as to the method or means of doing the work. These numerous examples are given because of the tendency on the part of some architects and engineers to reject work under such circumstances, involving all concerned in expensive and needless litigation and opening themselves to severe and sometimes well merited criticism.

There has been a tendency in some quarters to specify in such a way that only one certain patented or exclusive kind of material can be used, when for all practical purposes the equal of that could be specified. This should be avoided because it often causes a contractor to increase his estimate, and because it opens the door for questioning the architect's motives. If the specifications are made liberal in this respect and call for material of a certain make or equal, the architect is of course the judge as to what is equal and the owner is thus protected in this respect. It might be here noted that if the specifications do call for a particular brand or equal, the contractor may use the equal material in the first instance, and it has been held that such use could not be made to depend upon the question as to whether the material specified was procurable or not. I quote the following excerpts from a late written discussion of the subject: "The engineer or professional adviser who draws up the specifications is too lazy to write out the details of the paragraph and so he says we will leave that to the judgment of the architect or the engineer. It is the result of his own mental laziness. Now, then, if you go to the opposite extreme and specify everything, there is nothing left for the engineer to decide, and there is nothing left for the arbitration to decide, . . . leaving also much less to fight about than if you left the things to the discretion of the engineer or put in 'big stick' compulsion clauses, which do not belong there."

"Let the professional advisers work entirely for the man who employs them, and nobody else, and not have him a judge of any kind whatever. When he is not acting as a judge he will write specifications that will explain themselves. . . . It is morally wrong to have a judge in litigation paid by one of the litigants. If our judges on the bench were paid that way . . . you would get wrong decisions; and this is a case where you propose to have the judge paid by one of them, the owner, and expect him to judge fairly between the owner and the contractor."

In connection with this subject, however, it should be noted that the satisfaction of an architect does not permit the architect to force his personal idiosyncrasies or personal tastes upon a contractor. To require work to be done "in the best workmanlike manner," or with "material of the best quality" does not permit the architect to arbitrarily and unreasonably declare that work or materials are not such as called for in the body of the specifications. The legal rule for these instances is "that which the law will say a contracting party or architect ought in reason to be satisfied with, that the law will say he is satisfied with"; or in other words, all that is required is materials and workmanship which would satisfy that legal creation named a "reasonable man."

Thus it is that materials and workmanship for a building cannot be compared with portraits, statuary, clothing, etc., which require the absolute satisfaction of personal taste.

A few jurisdictions have held that where work to the satisfaction of the architect is required, the architect acts as an arbitrator, whose decision is final and conclusive; that it is not a question of his good faith, and the only hope of the contractor is to prove that the expression of dissatisfaction on the part of the architect was the result of fraudulent collusion with the owner. This extreme legal interpretation, which might cause the contractor, excepting in cases of substantial performance, to forfeit his compensation, was apparently beyond the equitable views of the layman, and the Legislature of Pennsylvania in 1907 passed a statute providing that no contract clause making an architect's or engineer's award or certificate final or conclusive should oust the Courts of their jurisdiction, and that any controversy arising on such a contract should be determined in due course of law with the same effect as if such provisions were not in the contract. For some unknown reason municipal corporations and corporations with power to exercise the right of eminent domain were specifically excluded from the operation of this statute.

Further, the satisfaction or dissatisfaction of an architect must be promptly expressed, since it is held that when the architect has power to reject materials, and he does not do so, or does not inspect it until it is in place, and when its removal would cause serious loss to the builder, then such delay operated as a waiver and the builder need not take it out, and if required so to do he can recover his damages caused by the replacement from the owner upon the theory of a breach of the contract by the owner's agent, the architect.

Of course even under the strictest contract clauses, an architect cannot have the arbitrary right to remove any proper material actually in place, though he might in some jurisdictions refuse to permit such materials to be used and condemn the same as not fulfilling the requirements of the contract.

The above considerations call for the serious attention of the architect to his specifications, which should contain the following essential features:

"(1) Completeness — Every requirement properly specified, and provision made to check work to insure nothing is omitted.

(2) Accuracy — Specifying clearly what is desired; correcting former errors, revising methods, etc.

(3) Brevity — Elimination of a superfluous matter, and condensation of descriptions by careful selection of words and expressions.

(4) Arrangement — Placing subjects in proper and clearly defined divisions and sub-divisions to insure general conditions, etc., clearly indicating the work they were intended to govern, and to facilitate ease in reference."

This recommendation is so stated, enlarged, and the entire subject well considered in a Report on Uniform Specifications for Buildings, published in March, 1911, *Journal of the American Society of Engineering Contractors*, to which those further interested are referred.

The writer's personal experience in this regard causes him to recommend the English practice of having a statement of the quantities of the various kinds of work and materials made for the contractor to bid upon in addition to the plans and general specifications. That custom abroad has resulted in the architects giving over this work to another party named the "quantity surveyor" who is personally responsible to the contractor for the accuracy of his statement. At least one state has by legislative action required such a bill or list of quantities to be prepared and furnished by the architects or engineers of all public buildings, said list to be attached to the plans and specifications as a guide to the bidders. Such a bill or list of work and materials prepared by the architect who best knows what is going to be required of the contractor seems to be an easy solution of many of our serious building disputes.

There are instances where an owner has changed his mind after the architect has completed the general working drawings and specifications and the architect is then called upon to plan differently. In one case the architect was employed to prepare plans and specifications for a two-story building, which plans and specifications were duly completed. Thereafter at the employer's request the architect prepared plans for a three-story building. It was held that the two sets of plans were properly regarded as applying to two different buildings and that the architect might recover two and one-half per cent of the estimated cost of each Similarly a change of area of a building has been held to entitle the architect to charge and recover for two sets of plans. Thus it would seem that if complete plans and specifications are finished in accordance with the owner's suggestions, and the owner thereafter entirely changes the character or scope of the work, the architect may consider the order for the second set of plans and specifications as a new contract having no relation to the work done even under a prior written employment.

In some jurisdictions it is held to be the duty of the architect to furnish the owner with a form of contract, bid, and bond for the construction of the proposed building. This does not seem to be fairly implied under the usual contract of employment, and such a duty must depend either on a contract requirement to that effect or upon local custom. The mere fact that the employer approves the plans and specifications and signs the proper documents permitting said plans and specifications to be filed with a municipal building department has been held not to be any excuse for faults therein of which the employer is not a competent judge. This warning is given so that the architect may know that approval by an owner does not prevent such owner from later refusing either to accept the plans or to pay for the same; nor does it prevent him from setting up any defense as to the lack of skill or as to any faults or defects that may be found to exist therein.

The next duty would seem to be the securing of the approval of the plans and specifications prepared and accepted by the owner, by the Building Department, Art Commission, or whatever other body is required to pass upon same, so as to obtain the necessary permission to erect the building as planned. There is a serious question whether this duty is required to complete performance so as to earn the percentage payment for plans and specifications sufficient for bidding purposes or whether it is part of the superintendence. Having in mind the

fact that plans and specifications are useless without such approval, it is suggested that this should as a matter of precaution be considered as a requirement involved in the preparation of plans and specifications and as a condition precedent to the recovery of the usual two and one-half (2½) per cent partial payment.

Provided the architect's employment is not restricted to a mere furnishing of drawings and specifications, the next duty is that of honestly and conscientiously advising the owner regarding the bids and bidders and assisting him in his selection of a responsible builder. Then comes the duty to furnish details as required and superintend the actual construction work.

In the preparation of the detail drawings care should be taken so that they do not require more than is shown or can be fairly implied from the original plans and specifications. The general rule seems to be that if the details vary materially from the original drawings and involve much additional labor or expense, and if the architect orders the contractor to do such work without giving him a written order as for extra work, then the contractor may refuse to proceed with the work at the contract price and recover at least for all the work he had done; or he may proceed with the work as ordered after protest not only to the owner but to the architect, and thus raise the legal question as to whether such work was as a matter of law within his contract or not.

In the superintendence an architect must bestow such care and attention that no material variation in the plans and specifications is permitted, and detect and guard against all such defects as can be discovered by the exercise of ordinary skill and attention. Failure so to do may cause the architect to lose his compensation even though the owner may have a remedy against the contractor.

Since the employment of an architect depends upon a personal trust and confidence reposed in his skill, the common statement is made that the architect cannot be permitted to delegate any of his duties or powers without express authority to do so. The modern building and the practical changes in our methods of handling building construction work has required and permitted some divergence from this absolute rule of ancient law. At the present time there seem to be four general exceptions: first, where there is a lawful custom or usage to authorize it; second, when the act is purely ministerial or in other words requires no exercise of judgment; third, where the object of the agency cannot be attained otherwise; and fourth, where the employer is aware that the architect will appoint a subordinate for certain details. In all instances of delegation the architect must see that the acts and operations of his assistants are just, reasonable, and correct; and since he is responsible for the acts and defaults of his subordinates to whom he intrusted details, he should choose subordinates having the necessary knowledge, experience and ability. A common source of trouble, irritation, and annoyance upon a building is the architect's representative, and the cause may be due to his incompatibility, ignorance, lack of experience, or dishonesty. Many of these subordinates are newly graduated college men with a great deal of theoretical or book knowledge, but with absolutely no conception of the practical ways of doing things or of the fact that time is an essential element in building construction. In addition, their usual lack of knowledge of the relations between the various trades, the power of labor unions and their walking delegates, and their general inexperience in dealing with men, coupled with their pride and failure to seek and ask advice, do not tend to hasten the work, or create the proper atmosphere for hearty and zealous co-operation on the part of all concerned.

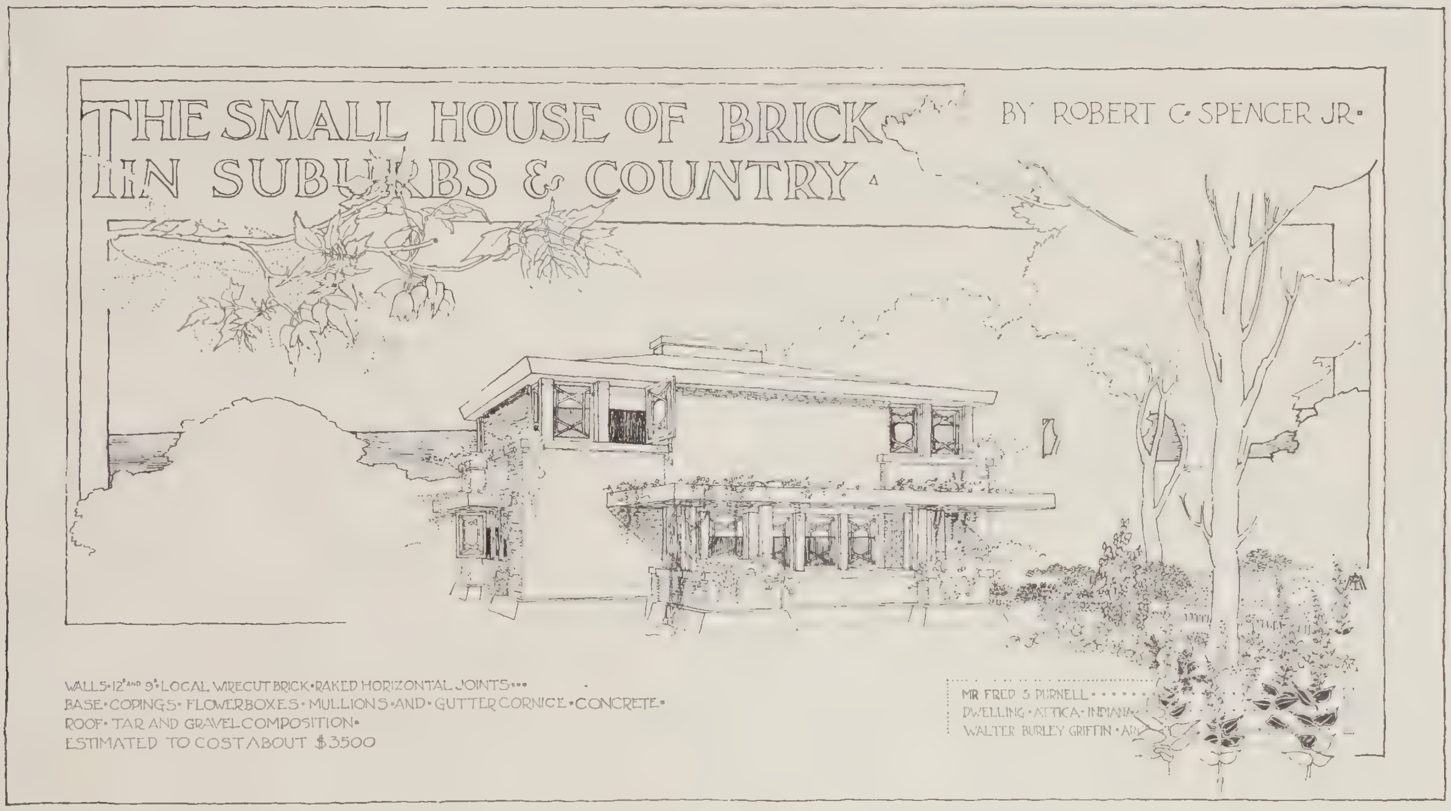
Another type of clerk of the works consists of a class of men who know what is right, but their remuneration is so small that they have to depend upon their position to aid them in securing what they consider living expenses. In this connection another fruitful source of trouble is the retention by the architect of a clerk of the works who has taken a grudge against the contractor, sub-contractor or foreman, so that for personal reasons, or to satisfy such personal grudge, work well within the specifications is ordered to be replaced or materials rejected which properly should be accepted.

Most, if not all, of these troubles may be avoided if the architect will give the job the personal supervision which it requires, and which it is his duty to give. If the employe is without experience, the architect should see that some experienced person keeps close watch of things and teaches and advises the beginner. He should also remember that his clerk of the works or inspector is human and not infallible, and his assertions and statements should be verified by the architect personally, just as he would verify statements or opinions of the contractor or of a materialman.

Upon one occasion an architect did not measure the work or check the estimate upon which his certificate for a payment was issued, and it was objected that such a delegation of authority to another would invalidate the certificate. The Court held that that did not make the certificate bad, it being admitted that the architect had behaved in perfect honesty in the matter and that there was nothing in the shape of corruption or improper conduct attributable to him. In that case there was a suggestion that for the details of much of an architect's work it might well be that the architect, while well skilled in the general rules of architecture, etc., and a thoroughly competent architect, might not be skilled in the particular details of general construction, and therefore that a subordinate might be better able to make the measurements and estimate upon which the architect's certificate would be based than the architect himself.

An architect as well as every employee or servant is bound to obey all lawful orders of the employer within the scope of the employment; and he must not be guilty of gross moral misconduct, or of habitual negligence in business, or of conduct calculated seriously to injure his employer or his business. The penalty may be instant dismissal.

Our considerations of the architect's duty to his employer have been legally summed as follows: "Those who employ him have a right to his best judgment, to his skill, to his advice, to consultations with him and to his absolute fidelity and good faith, and when the architect has contributed these things to the person who employs him his duty has been fulfilled."

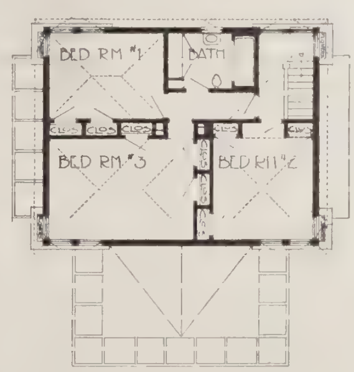


AN INTERESTING topic, to be sure, offering some latitude in its interpretation.

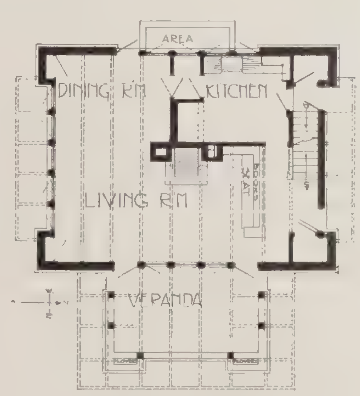
But how much or how little may we mean by "small"? To be liberal, let us say fifteen thousand dollars, more or less, preferably much less, providing that the material for illustrations can be found without going abroad, where, of course, there is easy picking.

Doubtless many architects who can build attractive little brick houses and bungalows for the readers of popular illustrated journals to cost but three or four thousand dollars — *on paper* — would throw up their hands if limited to an appropriation of six. But to build, or to discover built, well designed, individual houses, wholly of brick, or of the "half and half" type, costing between five to ten thousand — to say nothing of a still lower price limit — is another story. This is true, even in our most productive brick-making districts.

In looking over nine miscellaneous volumes of THE BRICKBUILDER, ranging over a period of twelve years (and this journal probably publishes more good brick houses than any other), I found illustrated thirty-two houses of moderate cost, representing the work of a dozen architects, which seemed good enough to illustrate this article, had they not already appeared. Than this, no better illustration could well be had of the rarity of good small brick houses in the United States. Of these thirty-two houses not all possessed particularly interesting or individual qualities of design, and only a few showed any marked degree of brick technique.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

Upon the beauty and sterling structural qualities of brick as a material for the exterior walls or wall envelopment of the small house, it is not the purpose of this article to dwell.

The advantages of brick as a building material at once beautiful, adaptable, and durable are too well known and have been already too well set forth in these columns to need repetition. But why, since brick is so desirable a structural material for even the most modest cottage or bungalow, is it so seldom used for minor residential work, and when used, why are the results usually so bald and commonplace?

The cost, by comparison with all frame, or with frame and stucco construction, is the chief reason. Minor reasons are a frame-house habit of mind, which we as a people have acquired through over a century of cheap lumber. There is also the difficulty of securing good brick masons for small jobs, and, in small towns, a lack of practical experience in the use of brick on the part of the majority of those architects whose practice is largely restricted to the small house. This latter condition, of course, is largely due to the saving in *first cost* effected by adhering to the customary frame construction. Stucco on wood or metal lath is only fairly beginning to replace wood for surface envelopment, because of the relatively small difference in cost and the elimination of expensive repainting or restaining, but country

A larger house of the three-bedroom type with roomy attics, stucco and "half timber" treatment of gables, walls of kiln-run pavers, in dull, buff colored mortar. Base, sills, and copings of bricks on edge. Shingled roof. Somewhat unusual in its placing, but very convenient and livable is the large living and dining porch, which is screened in summer and glazed in winter. Cost about $7,500 at Morgan Park, a suburb of Chicago.

architect-builders still hesitate to experiment with it. They still cling to the painfully neat American clapboard, and build wooden *shells*, not *walls*.

The American is always ready to take a chance, if he feels that by so doing he can make money, or save money, which is sometimes, but not always, the same thing.

In deciding for a frame house, he takes an extra chance of fire loss and faces a certainty (although he seldom estimates it as an average annual tax) in the future cost of repainting and repair which may be forecast with a reasonable degree of accuracy, if he expects to maintain appearances, as well as his property.

If he decides for frame and stucco, he takes a smaller chance as to fire, particularly as to exposure from *without*, although in the country, or in a roomy suburban lot, there is small danger of fire exposure, except from within. And in this latter respect — inside exposure — the average brick house is also vulnerable only in a less degree.

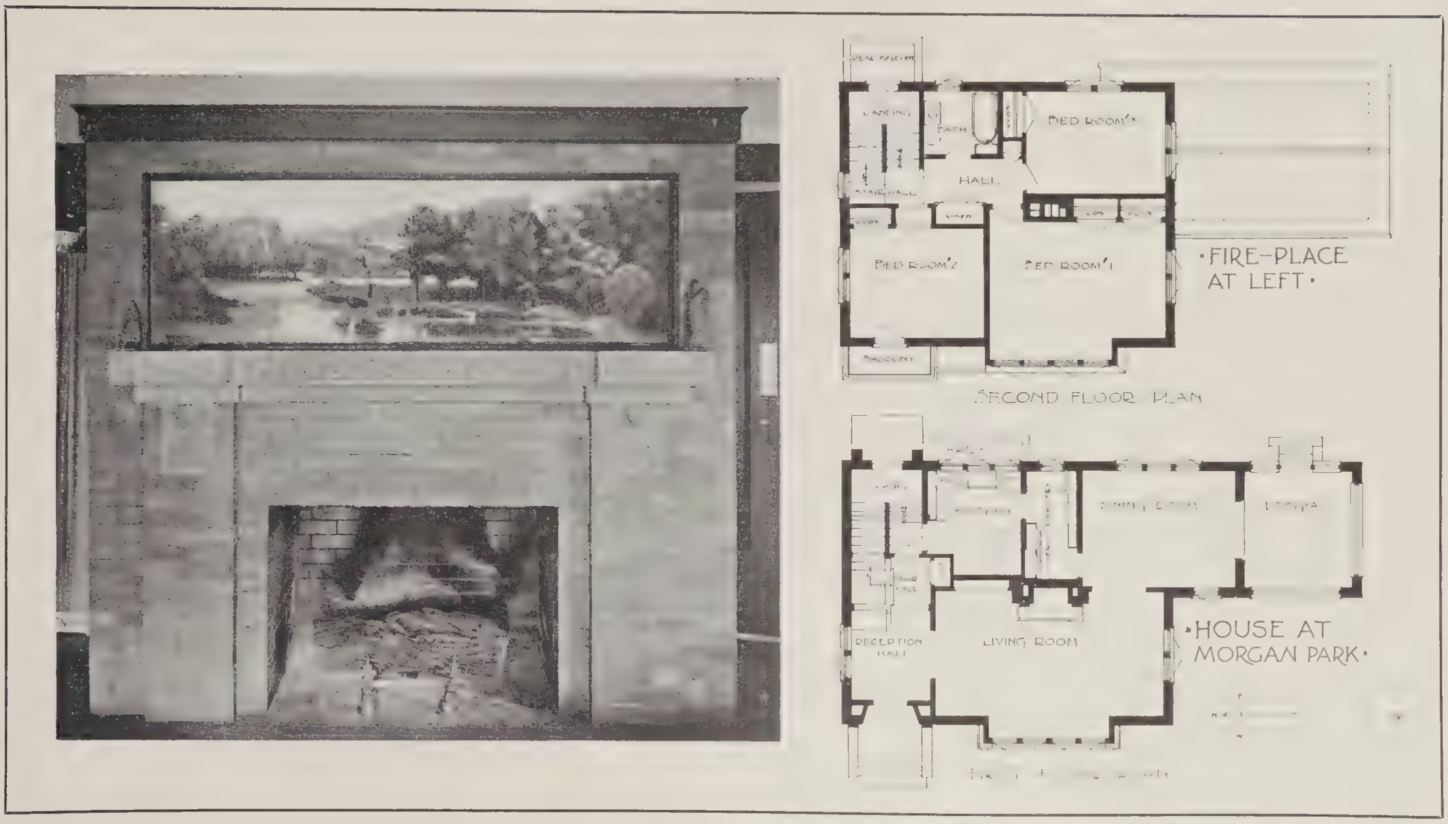
With wooden floor and partition construction, no metal lathing or fire-stopping, poorly built chimneys, etc., everything may readily burn, or be wrecked by a fire, except the bare brick walls. Yet, is it not indeed worth a little both in money and sentiment if the walls can be depended upon to remain standing?

For the builder of the small house, the saving in first cost, due to all-frame construction, will in a few years cease.

In the suburbs of our larger cities, the wide adoption of cement stucco for exterior envelopment, by the speculative builders of cheap houses, is the first step away from wood toward brick, showing clearly how the cost of lumber good enough for exposed outside work has advanced in the last few years.

While there are many doubters of the lasting qualities of exterior cement stucco over wood, there is good reason to believe that it can with proper care be made to last as long as the average house enveloped in wood. Costing but a small percentage more, and more substantial in appearance with a decided saving in upkeep, its popularity must continue to grow as the price of lumber continues to rise, and as a knowledge of proper methods of its use and of its possibilities becomes common.

At present but few architects are able to secure good stucco color and texture, particularly in country work, dependent upon country builders. Ready-prepared



"rough-cast" or float finish material, ensuring fairly uniform matching of samples for color and texture, are not available for the small house, except within a relatively short haul from the few producing centers for such material which now exist.

The finished wall effect of any selected make or shade of brick in combination with different mortars and in different bonds can be anticipated with reasonable certainty, and verified in advance by the experimental erection of bits of sample wall a few square feet in area on the building site while the foundations are being laid.

There is another difficulty common in frame construction which brick avoids and which the average architect seems not always to appreciate.

Where the contour of the home site is enough out of level to preclude artificial leveling to a single water table or base grade; and the walls of the house to be effective must grow sheer up from the slopes of the ground, — only solid masonry walls are satisfying.

A ground level water table, or stylobate, is good only on a site naturally level, or easily leveled without marring its natural character.

Extensive formal terracing may overcome this difficulty, but the small house owner cannot afford the long formal terrace as a flat base for his building, and terrace walls on a picturesque or broken site should be of masonry. Pseudo terraces — commonly termed "open porches," with frame walls and wooden floor construction instead of a solid, satisfying earthen fill, are, of course, a common adjunct of the frame house.

If, for the sake of paving with brick, tile, or cement, walls of porches and terraces are built of brick in connection with frame and stucco houses, there is a large risk of cracks developing where the frame and brick walls join to form flush stucco surfaces.

For a house of moderate cost, bricks of local or not far distant manufacture must be used for economy. In the middle West we are fortunate in being able to secure excellent sand-moulds or pavers at prices varying from \$6.00 to \$10.00 at the kilns and from \$12.00 to \$20.00 or more per m. delivered at the building in Chicago and suburbs.

Most architects, as well as many laymen, have now learned to know the beauty of rough bricks, particularly for suburban and country work.

One of the chief difficulties in securing effective rough brickwork is the common predilection, which appears to be shared by many architects, as well as owners, for very dark gray to black mortar for the facing joints, although every colorist knows that even a small admixture of black tends to kill and muddy his color tones in any medium. In rough brickwork, the brick unit is relatively so small, that the colors of bricks and very dark mortar tend to mix in the eye of the observer, producing a dull, hard, and more or less "muddy" effect. For purity and richness of color quality and nice definition of bond texture, the mortar should always be at least somewhat lighter than the average tone of the bricks.

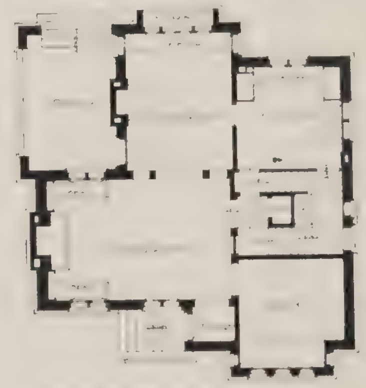
As a rule, the light gray of the lime and cement mortar ordinarily used for brickwork at the present time is sufficiently toned away from a dead white to produce very satisfactory results with the lighter red bricks. With bricks of a deep, strong red or with the deeper brown or purplish shades of hard burned kiln-run pavers, a small quantity of lampblack in the mortar produces a softer and quieter gray.

With the ordinary mineral red mortar color, a dull, soft pinkish shade, considerably lighter than the average tones of the bricks may be obtained, which is very agreeable, and not so hard in effect as the light gray joints. With the buffs or ochres, rich warm effects may

A compact little four-bedroom house of the suburban type, designed by Tallmadge and Watson, with den or library on first floor; living and dining porch placed similarly to that at Morgan Park in preceding illustrations. Brick base, sills, and band courses in gray mortar; slate roofing. Built on the south side of Chicago at a cost of about $6,500. Plans below.

Detail of a composite brick and frame house by Tallmadge and Watson.

SECOND FLOOR PLAN



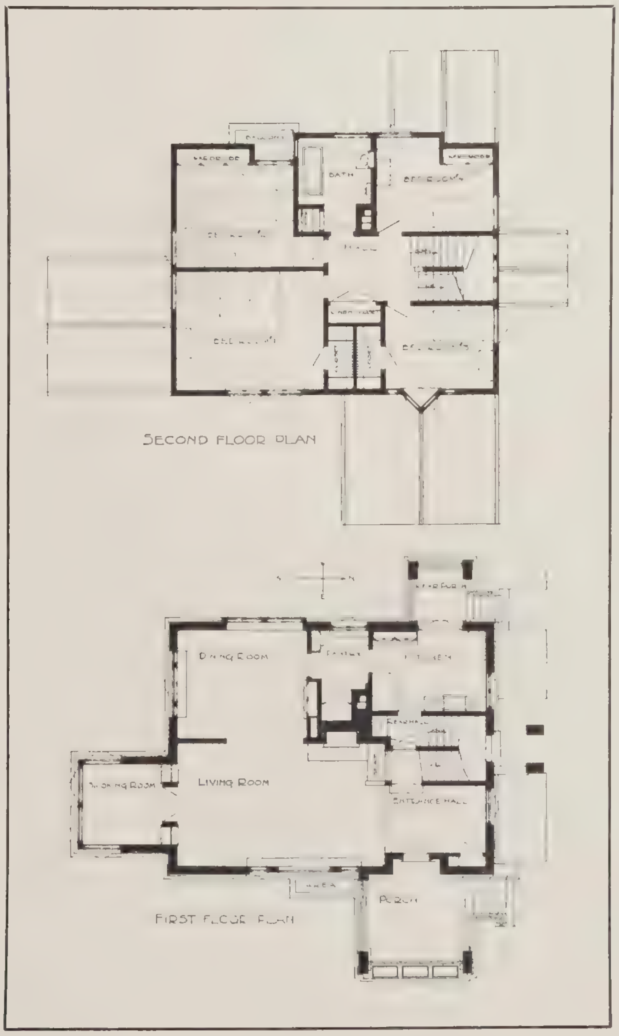
FIRST FLOOR PLAN

House at River Forest, Ills., designed by William Gray Purcell. The smoking-room is a unique adjunct of the living-room, and with its four double casements is practically a porch in warm weather. The horizontal joints of the brickwork are raked out and the vertical joints struck flush, giving a decided horizontal texture to the first story. The roof is of variegated gray-green and purple slate. The rough cast surfaces above the first story are of a rich warm buff color, with olive green wood trim, and inlays of colored tiles.

be given to walls of sand-mould bricks; care being taken not to make the color too strong.

Returning to the use of lampblack for the deeper gray mortar tones, the writer has had so much trouble in obtaining the proper shading and an evenly colored mortar that he is inclined to depend entirely upon the cement mixture, even where the resulting shade is lighter than might be desired.

Owners, who often have a fatal predilection for very dark joints, have on a number of occasions taken upon themselves (in their rôles of active assistant superintendents) to order the masons to increase the quantity of lampblack used, much to the detriment of the work. As a result of this sort of "butting in," on a large country place the gate lodge has medium gray joints, the stable and garage nearly white joints, and the house shows all shades from light gray to



black, for the owner was a very determined person and set in his ways.

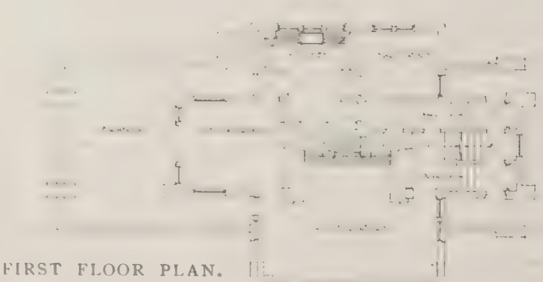
Mortar mixers appear to be very careless in mixing mortar color, however earnestly warned by superintendents. Lampblack appears to differ from other colors in having comparatively little effect in darkening mortar up to a certain point, after which the darkening is so rapid (running to a deep blue-gray) that it seems dangerous to attempt a deep gray, except by the use of a pure, dark setting cement, gauged with just enough lime mortar to allow free working.

Temperature also seems to have much to do with the final color of mortar toned down with lampblack. When used in very cold weather (as is found necessary in this latitude) it does not seem to bleach out in drying, as in warm weather.

Where the erection of a large brick house is commenced rather late in the

A house at Evanston, Ills., designed by Walter Burley Griffin, Architect, which cost about $10,000. First story of wire cut stiff mud process bricks from Ohio (red shading into yellow olive), with deeply raked horizontal joints. Rough cast above, soft light tan in color. Exterior woodwork stained brown. For a comparatively small house the plan places rather unusual emphasis on the out-door living accommodations; the main interior space of the veranda being about 16 by 22 feet, and a sleeping porch above of liberal dimensions. The treatment of eaves and shingled roofs and the wood muntined casements give a somewhat Japanese touch to the design, which is pleasing however outside the pale of conventional, "stand-pat" architecture.

SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

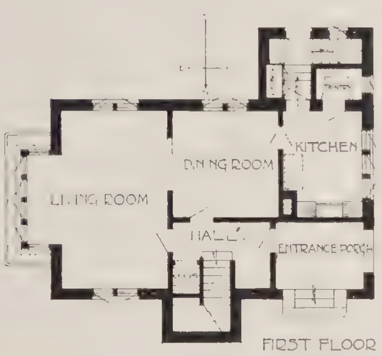
Fall, the mortar is liable to be subjected to a wide range of temperature. To what extent the widely disappointing variations in mortar color, from light gray to blue-black, in certain cases, have been due to carelessness in mixing rather than to these extreme changes in temperature, there is, of course, no means of knowing, and the fact can only be ascertained by special experiments. But wide temperature variations furnish an excuse to the mason. Within certain limits, it is true that variations in mortar tones are agreeable, but it is often difficult to hold bricklayers to a sufficiently small variation for a reasonably uniform effect in all wall surfaces.

With any kind of mortar color, the architect must be constantly on guard against variations which will cause a noticeable patchy effect, as between different large areas of wall surface.

While horizontal joints struck from *below* undoubtedly weather better than those struck from above, the latter produce a more pleasing effect, particularly where seen from below. The former if neatly struck are shadowed by the next course of bricks and the shadows neutralize the contrast of light and dark between the mortar and the bricks.

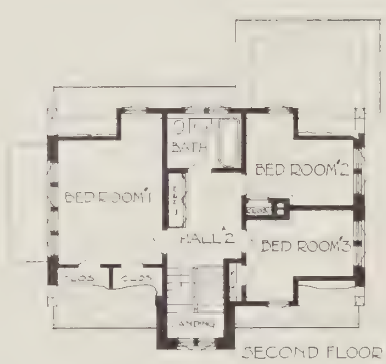
A discussion of brick bonds would add little to what has already been written and illustrated in this journal. For the small house, what is known as "Chicago bond," one course of headers every fifth or sixth course, looks well, particularly if worked out carefully to space with heights of openings, and is the most economical, particularly where the backing bricks, as often happens, differ in make and size from those used in the facing.

Notwithstanding the wide range of effects obtainable in bonding, in using bricks of two or more quite different shades and varying the mortar color, they are, as a rule, too expensive for the small brick house, and, unless the unit of bond texture is small, as in the case of cross-bond, which is scarcely a pattern at all, there is not enough broad, unbroken wall surface to justify its use. One of the best examples known to the writer of strong pattern of relatively large scale in domestic work, is "Sandhouse"



FIRST FLOOR PLAN

THIS GATE LODGE AT LAKE FOREST WOULD MAKE A GOOD SUBURBAN COTTAGE OF THE THREE BED-ROOM TYPE. WALLS ARE KILN-RUN PAVERS IN GRAY MORTAR. ROOF, RED AKRON TILE. THE STONE-COPED GABLES LOSE THEIR SEVERITY AMID THE SURROUNDING FOLIAGE.



SECOND FLOOR PLAN

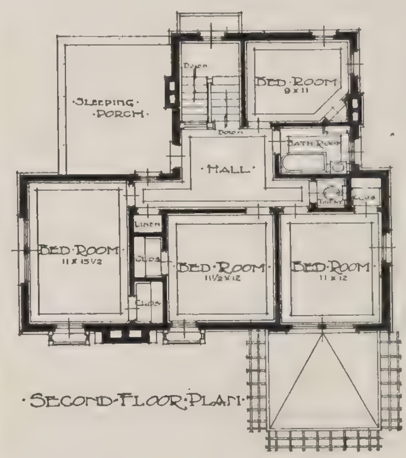
INTERIOR OF HOUS AT EVANSTON BY W. B. GRIFFIN ARCHITECT.

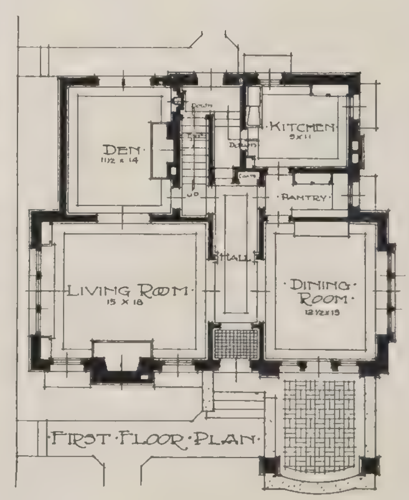
SHOWING THE EFFECTIVENESS OF A FIRE PLACE DESIGNED ON SIMPLE LINES.

in England, designed by Mr. Troup. Although there is a good deal of wall surface, and the pattern has been very cleverly managed, it would seem to little enhance the beauty of the building, although, of course, it adds a decidedly individual touch.

In building of brick with a sharp eye to economy, it was suggested in this publication some years ago, by Mr. Cram, and illustrated by sketches of some charming English cottages of brick, that 9-inch walls, above the basement, for a small two-story house or cottage should be considered sufficient. With good, hard bricks, laid in mortar containing plenty of Portland cement, this would seem to be true, particularly in view of the comparatively recent development of damp-proofing preparations, which, when thoroughly applied to the inside wall surface, ought to make a well-built 9-inch wall more impervious to dampness than the 13-inch wall, without such treatment. As for strength, the two-story 9-inch wall should be sufficiently heavy, carrying moderate spans, particularly if narrow piers are avoided and buttresses or pilasters (either internal or external) introduced to break up the longer stretches of wall. By reducing the customary story height, 2 feet can be saved in the height of a two-story house, the rooms made cozier and more homelike, and the number of steps between floors reduced, the latter a convenience and comfort not to be despised.

The writer's own house has a first-story height of eight feet in the clear, the dimensions of the living room being 19 x 25 and a second-story height of 7 feet 6 inches. Notwithstanding popular prejudice as to the superior airiness of high rooms, this house is delightfully cool in summer, if there is any coolness out of doors. All of the windows are casements, opening out, giving us the benefit of each entire opening, catching every passing breeze, and adding far more to the ventilation of the house in warm weather than would an additional foot of height in each story, since in warm weather the heated air in any room remains stagnant only above the level of the window tops, or in the case of a house with double hung sash, above the top of the actual warm weather opening, which in most houses is at the meeting rail and not at the top of the window.





HOUSE AT DENVER, COLORADO.

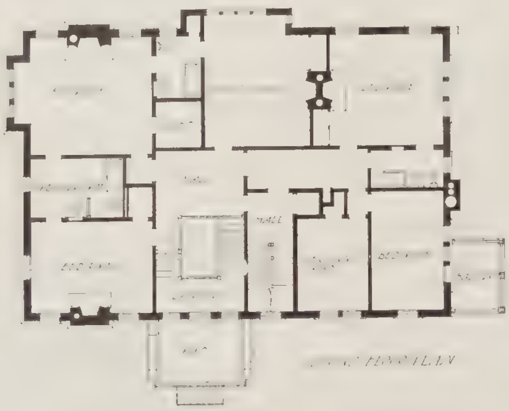
Varian & Varian, Architects.

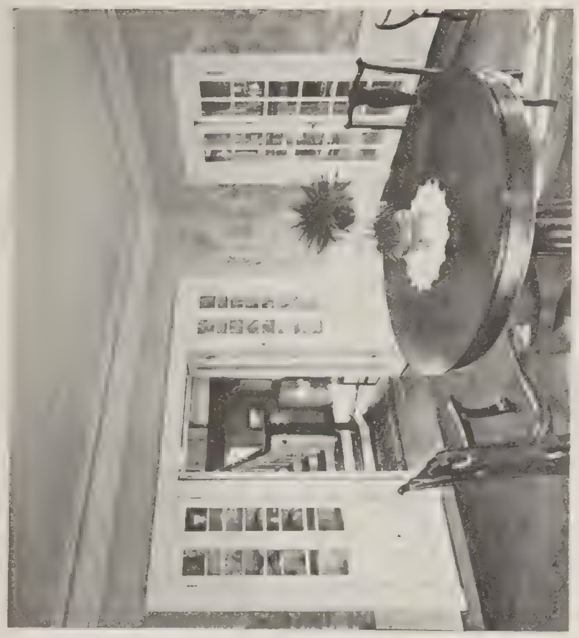
HOUSE

AT

ST. LOUIS, MO.

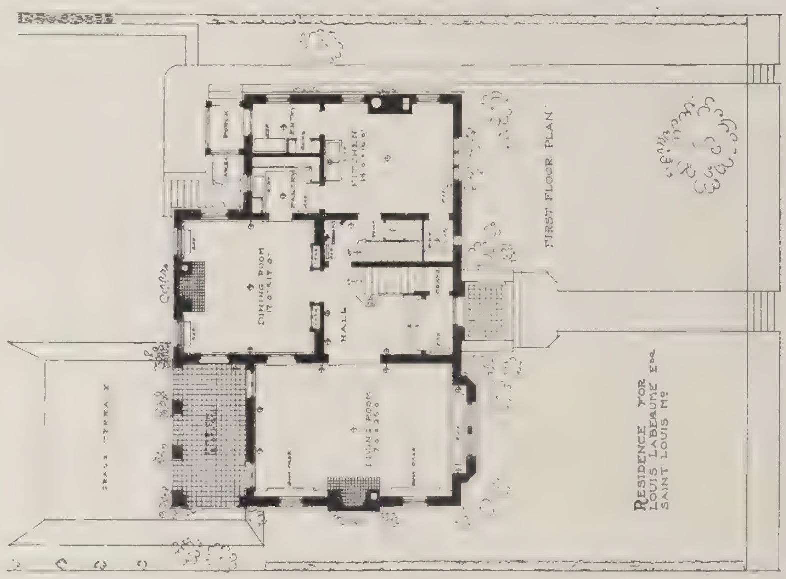
Mauran, Russell
& Garden,
Architects.





HOUSE AT ST. LOUIS, MO.

Mariner & La Beaume, Architects.



Editorial Comment and Miscellany.

PERRY MEMORIAL COMPETITION.

THE Building Committee of the Perry Memorial announces a competition for the selection of an architect for the Memorial which will be erected at Put-In-Bay, South Bass Island, Lake Erie, near the place where Perry s victorious action was fought. The Memorial will commemorate not only the victory but the subsequent one hundred years of peace between the United States and Great Britain.

LA SALLE HOTEL, CHICAGO.
Entire trim above lower three stories of architectural terra cotta, executed by the Northwestern Terra Cotta Company.
Holabird & Roche, Architects.

It will consist of a lofty commemorative monument with a museum of historicrelics at its base standing in a reservation of fourteen acres. $600,000 will be expended upon the construction of the monument and museum. The reservation will be designed as a suitable setting for the Memorial.

DETAIL FOR HIGH SCHOOL.
Executed by the South Amboy Terra Cotta Company.
Guilbert & Betelle, Architects.

The program, which conforms to the principles approved by the American Institute of Architects, has been so drawn under the direction of the Committee and Mr. Frank Miles Day, adviser to the Committee, that the problem presented is a most attractive one. Competitors will have the fullest scope for their artistic imagination. The prize of the competition will be the appointment as architect to design and superintend the construction of the Memorial. There are also to be three premiums for the authors of the designs placed next to the winner.

The Building Committee will be advised in making its awards by a jury of well-known experts.

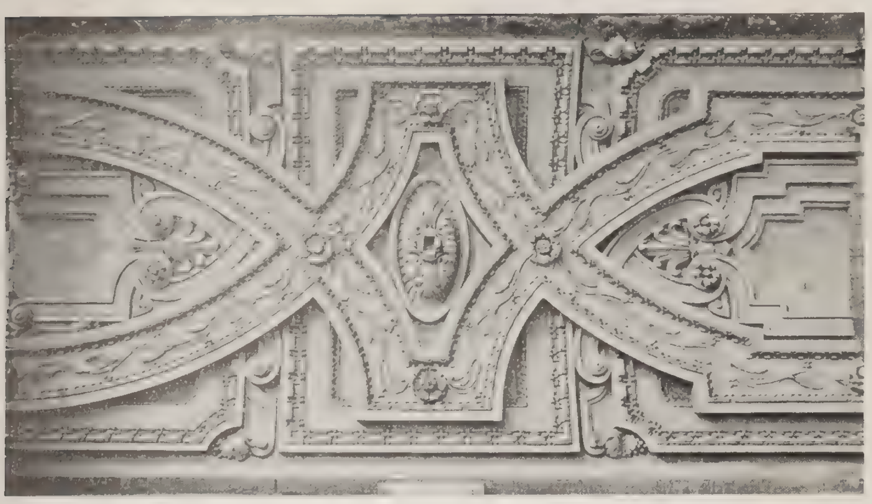
Architects desiring a copy of the program, which sets forth the conditions of participation, should make application to Mr. Webster P. Huntington, Secretary to the Building Committee, Federal Building, Cleveland, Ohio.

DETAIL.
Executed by the Rookwood Pottery Company.

PARNELL MONUMENT, DUBLIN.

THE Parnell national monument, which was unveiled in Dublin, Ireland, on October 1st, was one of the last works of the Irish-American sculptor, Augustus Saint Gaudens. The monument, which is built of Shantalla granite, is a triangular obelisk, rising 67 feet above the street level and crowned with a bronze tripod 8 feet high. The base rests on a platform 26 feet in diameter,

DETAIL FOR STATE EDUCATIONAL BUILDING, ALBANY, N. Y.
Executed in terra cotta by the Atlantic Terra Cotta Company.
Palmer & Hornbostel, Architects.



DETAIL FOR STATE EDUCATIONAL BUILDING, ALBANY, N. Y.
Executed in terra cotta by the Atlantic Terra Cotta Company.
Palmer & Hornbostel, Architects.

which is inlaid with a large trefoil of Barna granite, embracing the area of the base. The bronze statue of Parnell, 8 feet high, stands on a projecting pedestal about 9 feet above the street. Around the pedestal and the base of the monument are elaborate carvings with swags, underneath which are inlaid bronze wreaths and plaques. The entire cost of the monument, including the masonry and architectural work, was approximately $42,000. Henry Bacon, New York, prepared the architectural drawings.

"ART AND THE NATION."

THE ARTS AND PROGRESS for October contains an editorial on "Art and the Nation" which shows how architects, painters, and sculptors are not infrequently treated by building committees, public officials, and private individuals of wealth as though they were contractors, dealers in mere commodities, men to be hired as day laborers without regard to brains, inspiration or technics, training and skill. The article cites how often a building is dedicated, a statue unveiled or a portrait presented without the name of the artist being more than mentioned. It further states that many monuments have been erected to our heroes of war, a few to our statesmen, less to our writers, but none to our artists, and concludes with the encouraging thought, — "None are able to deny that conditions are improving."

ANNUAL EXHIBITION OF THE ARCHITECTURAL LEAGUE.

THE Architectural League of New York City at its last regular meeting defeated the proposition of charging a fee to non-members for submitting work in their annual exhibitions. The proposed fee was to be one dollar per square foot with a minimum charge of five dollars. The point was made that no matter at what sacrifice to themselves as league members, the annual exhibition should offer an open door to all exhibitors who have valuable material to show.

GATE LODGE, SPRING GROVE CEMETERY, CINCINNATI, OHIO.
Covered with green glaze "crown" Reinforced English Shingle Tile manufactured by
The Cincinnati Roofing Tile & Terra Cotta Company.
Elzner & Anderson, Architects.

Since the exhibition of the League has become rather an important institution it was voted to charge an admission fee of twenty-five cents on each day except Sundays. There will be, however, the usual liberality in the distribution of tickets free to students and draftsmen.

DETAIL FOR STATE EDUCATIONAL BUILDING, ALBANY, N. Y.
Executed in terra cotta by the Atlantic Terra Cotta Company.
Palmer & Hornbostel, Architects.

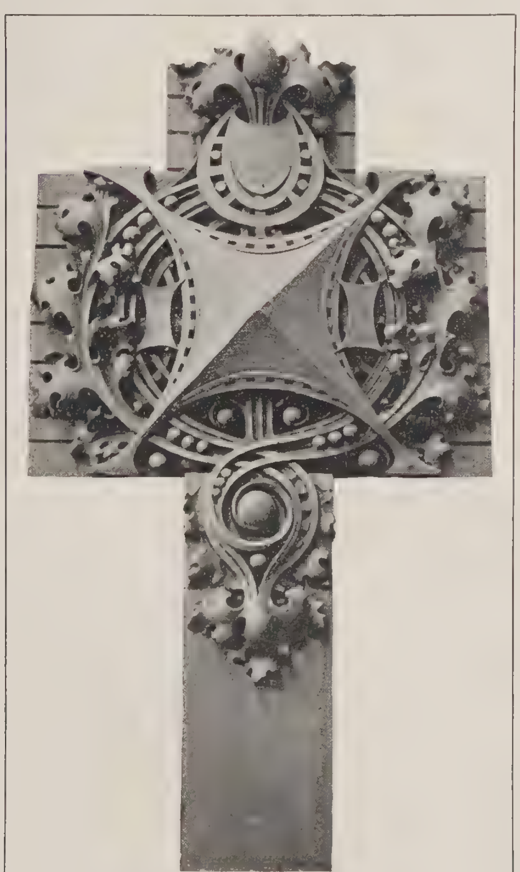
NEW CONVENTION HALL, PHILADELPHIA.

WORK has been started on Philadelphia's new Municipal Convention Hall which overlooks the Schuylkill River from a raised terrace, 70 feet above the

FAIENCE WALL FOUNTAIN IN AN APARTMENT BUILDING.
Executed by The Hartford Faience Company.
Russell F. Barker, Architect.

water. The building itself will be 624 feet long by 450 feet wide, finished in granite, light gray brick, and terra cotta. The auditorium will have a seating capacity of 18,500, which may be subdivided by means of a fire curtain 6 feet thick. There will be no stairways, and all approaches to the different floors will be inclined planes. The building will cost approximately $1,500,000 and has been designed by John T. Windrim, Architect.

BRONZE AWARD FOR ARCHITECTURAL MERIT.



DETAIL FOR STORE BUILDING.
Executed by Conkling-Armstrong Terra Cotta Company.
H. J. Klutho, Architect.

THE Architectural Club of South Bend, Indiana, has recently held two exhibitions, one in Indianapolis and the other in their home city. In order to stimulate architectural merit in their buildings the Club has established an annual honor award for the best building project completed in South Bend or vicinity. The award will be a bronze relief suitably inscribed and will be attached to the building selected by the jury of award. The announcement of same will be made at a formal dinner following the annual meeting at the Club.

DETAIL BY WARREN & WETMORE, ARCHITECTS.
The New Jersey Terra Cotta Company, Makers.

IN GENERAL.

Thornton A. Herr and Leon F. Urbain have formed a copartnership for the practice of architecture under the firm name of Herr & Urbain, with offices in the Marquette Building, Chicago.

The architectural firm of Reinecke & Jenkinson, Sioux City, Iowa, has been dissolved. William A. Jenkinson will continue the practice of architecture with Milton J. Henoch, under the firm name of Jenkinson & Henoch, at 406 United Bank Building. Manufacturers' catalogues and samples solicited.

DETAIL BY J. H. DESIBOUR, ARCHITECT.
New York Architectural Terra Cotta Company, Makers.

The American Enameled Brick & Tile Company will furnish approximately 200,000 English size, dull finish, enameled brick for the United

DETAIL BY
ROBERT A. SCHUMANN, ARCHITECT.
Executed in white mat glaze terra cotta by O. W. Ketcham Terra Cotta Works.

HOUSE AT ST. LOUIS, MO.
Built of Roman Brick furnished by the Hydraulic-Press Brick Company.
William A. Lucas, Architect.

States Post Office and Custom House, Porto Rico, W. I. The brick will be shipped by sailing vessel.

The Junior members of the Birmingham Society of Architects have organized an Atelier with Wm. Leslie Welton, holder of the Rotch Traveling Scholarship, as patron.

STORE BUILDING, DETROIT, MICH.
Terra cotta furnished by the Winkle Terra Cotta Company.
Frederick T. Bancroft, Architect.

A small book relative to the courses of instruction together with other features of the Lowthorpe School of Landscape Architecture, Gardening, and Horticulture for women can be obtained by addressing Lowthorpe School, Groton, Mass.

Arthur T. Remick, architect, has removed his offices from 37 East 28th street to 103 Park avenue, New York City.

The architectural firm of Cleverdon & Putzel, 41 Union Square, West, New York City, has dissolved. Robert N. Cleverdon will continue as the firm's successor, and Joseph Putzel will practise as a consulting architect and appraiser of buildings.

The Rhode Island Chapter of the A. I. A. will hold an exhibition of architectural and municipal improvements in Memorial Hall, Providence, from October the 21st to November the 4th.

Frederick A. Kendall and Delos H. Smith have formed a copartnership for the practice of architecture, with offices in the Corcoran Building, Washington, D. C.

Charles Russell Lombard announces the opening of offices for the practice of architecture at 95 Exchange street, Portland, Me.

The contract has been let for the New Field Museum to be built in Jackson Park, Chicago, at a cost of $4,500,000.

Considerable regret will be felt over the closing of the famous old landmark, Long's Hotel, located in Bond street, London. This is one of the many historic places which has had to give way to the ever increasing needs of modern commercialism.

Plans are being prepared for a $4,000,000 building to be erected on the public square in Cleveland, Ohio, which will be used for a railway terminal, hotel, and offices.

The contract has been let for an addition to the British Parliament buildings at Victoria, Canada. The new part is to be erected of British Columbia stone similar to that used in the original structure and will cost when completed $1,250,000.

It is reported that a large university will soon be founded on Staten Island, New York, which in wealth and equipment will rival all others. It is to be erected in memory of Christopher Columbus.

PARENTAL SCHOOL, MAYFAIR, ILL.
Roofed with York Tile furnished by the Ludowici-Celadon Company.

The Prix de Rome for sculpture has been awarded to Mlle. Heuvelmans, an honor which no woman has ever won before. Mlle. Heuvelmans is the daughter of a cabinet-maker and appears to have discovered her liking for this work when eighteen years old.

Archie H. Hubbard, architect, formerly of Urbana, Ill., has removed his offices to 300 First National Bank Building, Champaign, Ill.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., October 3, 1911.

SEALED PROPOSALS will be received in this office until 3 o'clock P. M. on the 16th day of November, 1911, and then opened, for the construction, including roof and ground surface drainage system, of a four-story, stone faced, fireproof building, of approximately 90,000 square feet of ground area, for the Bureau of Engraving and Printing, WASHINGTON, D. C. Drawings and specifications may be obtained at this office at the discretion of the Supervising Architect, but will not be ready for delivery before October 21, 1911.

JAMES KNOX TAYLOR, *Supervising Architect.*

"COMPETITION"

Approved by the Standing Committee on Competitions of the American Institute of Architects

The Public Auditorium Commission of Portland, Oregon, invites Architects of experience and in good standing to compete for a Public Auditorium to cost $450,000.00.

For information address: ELLIS F. LAWRENCE, Professional Adviser, 1019-1023 Chamber of Commerce Building, Portland, Oregon.

THE BRICKBUILDER'S ANNUAL ARCHITECTURAL TERRA COTTA COMPETITION.

Problem: A Store and Loft Building from Four to Six Stories High.

FIRST PRIZE, $500. SECOND PRIZE, $250. THIRD PRIZE, $150.
FOURTH PRIZE, $100. HONORABLE MENTIONS.

COMPETITION CLOSES AT 5 P.M., MONDAY, JANUARY 8, 1912.

PROGRAM.

THE problem is a COMBINATION STORE AND LOFT BUILDING FROM FOUR TO SIX STORIES HIGH. The site is assumed to be in the middle of a city block located in the shopping district. The land is level and has 50 feet frontage and is 100 feet deep. The building is to cover the entire lot on first floor only, with suitable provision for natural lighting of rear portion of this floor. The lighting of other floors is left to the designer. The basement, first and second floors are to be occupied by a concern doing a retail business. Since the character of the business may influence the design it is suggested that the store portion of the building be treated either for the sale of pianos, jewelry, millinery, men's furnishings, boots and shoes, furs, sporting goods, or some similar line of business. The plans above the second story are to be of the loft type.

The exterior of the building is to be designed entirely in architectural terra cotta, and it is suggested that at least portions of the walls be treated in color. It is further suggested that provision be made in the design for the placing of signs.

The object of this competition is to encourage a study of the use of architectural terra cotta in this particular type of building. There is no limit set on the cost, but the design must be suitable for the character of the building and for the material in which it is to be executed.

The following points will be considered in judging the designs:

A — The general excellence of the design, its adaptability to the prescribed material and character of the building under consideration.

B — The excellence of the first-story plan which, in addition to an attractive frontal treatment, must provide an entrance to a hallway in which will be located an elevator and staircase.

DRAWING REQUIRED. (There is to be but one.)

On a sheet of unmounted white paper measuring exactly 35 inches by 26 inches, with strong border lines drawn one inch from edges, giving a space inside the border lines of 33 inches by 24 inches, show:

The front elevation drawn at a scale of four feet to the inch.

The first-floor plan and a typical loft plan drawn at a scale of 16 feet to the inch.

A sufficient number of exterior details drawn at a scale of one-half inch to the foot to completely fill the remainder of the sheet.

The details should indicate in a general way the jointing of the terra cotta and the sizes of the blocks.

The color scheme is to be indicated either by a key or a series of notes printed on the sheet.

All drawings are to be in black ink without wash or color, except that the walls on the plans and in the sections may be blacked-in or cross-hatched.

Graphic scales are to be shown.

Each drawing is to be signed by a nom de plume, or device, and accompanying same is to be a sealed envelope with the nom de plume on the exterior and containing the true name and address of the contestant.

The drawing is to be delivered flat, or rolled (packaged so as to prevent creasing or crushing) at the office of THE BRICKBUILDER, 85 Water street, Boston, Mass., charges prepaid, on or before January 8, 1912.

Drawings submitted in this competition must be at the owner's risk from the time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. Those who wish their drawings returned may have them by enclosing in the sealed envelopes containing their names, ten cents in stamps.

The designs will be judged by three or five well-known members of the architectural profession.

For the design placed first in this competition there will be given a prize of $500.
For the design placed second a prize of $250.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

The manufacturers of architectural terra cotta are patrons of this competition.

The competition is open to every one.

THE BRICKBUILDER

VOLUME XX NOVEMBER 1911 NUMBER 11

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ADVERTISING

Advertisers are classified and arranged in the following order:

	PAGE		PAGE
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Architectural Faience	II	Brick Waterproofing	IV
„ Terra Cotta	II and III	Fireproofing	IV
Brick	III	Roofing Tile	IV

Advertisements will be printed on cover pages only.

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PLATE ILLUSTRATIONS

FROM WORK BY

GREEN & WICKS; WILLIAM B. ITTNER; MAURAN & RUSSELL; FRANK B. MEADE; PERKINS & HAMILTON.

LETTERPRESS

CHURCH TOWER, MEXICO CITY.

One of the most elaborate tile towers in Mexico, employing yellow, blue, and white glazed tile, and unglazed red tile.

THE BRICKBUILDER

NOVEMBER, 1911

VOLUME XX. NUMBER 11.

Comparative Cost of Various Types of Construction for Three Houses.

GEORGE HUNT INGRAHAM.

IT IS the purpose of this article to present the comparative costs of building three types of houses, each house having been figured in several types of construction. The three examples chosen for treatment are the work of Boston architects and a different set of contractors was employed to figure each house and each type of construction. The labor and materials have been figured at the prevailing Boston prices of to-day. It is felt that the arrangement of the data, which has been obtained at the expense of a great deal of careful work, will enable any architect to readily figure the difference in cost of different types of construction when applied to his own work. A fairly accurate idea of the different costs for the different types of construction is not only desirable but necessary, since the average client of to-day desires to know what the cost of his house will be if built of brick, terra cotta blocks stuccoed, wire lath and stucco, or regular wood construction.

The costs given do not include heating, plumbing, electric work, interior decorations, wall papers, and lighting fixtures. The reason for omitting these items is that it is desired to present the comparative costs on construction only. There would be little value in comparing the cost of a house heated by a hot air furnace with one heated by steam or hot water. Then again the character of the plumbing fixtures varies according to the personal taste of the owner, and one electric fixture in a house may equal the cost of all that would be put into another.

In addition to the original cost of a house it is of growing importance, especially to the owner, to take into consideration the cost of maintenance, and the figures relating to same which are here given are representative of the consensus of opinion held by several architects and builders of large experience.

The costs of all three houses are computed with shingle roof, dipped in stain before laying and given one brush coat after laying. A more permanent form of roof covering would be desirable, but this form was adopted for uniform comparison only.

The brick houses are all figured with Dover River water-struck brick, costing $19.00 per thousand delivered on the job.

The terra cotta block houses are of 8-inch block made by the National Fireproofing Company.

The cypress siding houses are of 8-inch cypress siding, painted three coats of lead and oil paint.

Of the houses under consideration, Putnam & Cox were the architects for number one, George Hunt Ingraham for number two, and James Purdon for number three. These houses have all been built, as may be seen by the illustrations. The estimated cost of each house if of wood construction is as follows:

TABLE I.

	Wire Lath and Stucco.	Cypress Siding (painted white).	Clapboards (painted white).	Shingles (stained).
Number one	$8,100.00	$7,800.00	$7,800.00	$7,875.00
Number two	16,970.00	16,400.00	16,500.00	16,200.00
Number three	19,685.00	19,625.00	19,625.00	19,625.00
	Cost per cu. ft.	Cost per cu. ft.	Cost per cu. ft.	Cost per cu. ft.
Number one, 34,089 cubic contents	23c.	23c.	23c.	23c.
Number two, 84,837 cubic contents	20c.	19c.	19c.	19c.
Number three, 72,380 cubic contents	27c.	27c.	27c.	27c.

If built of brick or terra cotta blocks stuccoed the estimated cost is as follows:

TABLE II.

	Brick.	Terra Cotta Blocks (stuccoed).
Number one	$8,820.00	$8,580.00
Number two	17,125.00	17,465.00
Number three	21,780.00	20,900.00
	Cost per cu. ft.	Cost per cu. ft.
Number one, 34,089 cubic contents	26c.	25c.
Number two, 84,837 cubic contents	20c.	20½c.
Number three, 72,380 cubic contents	30c.	29c.

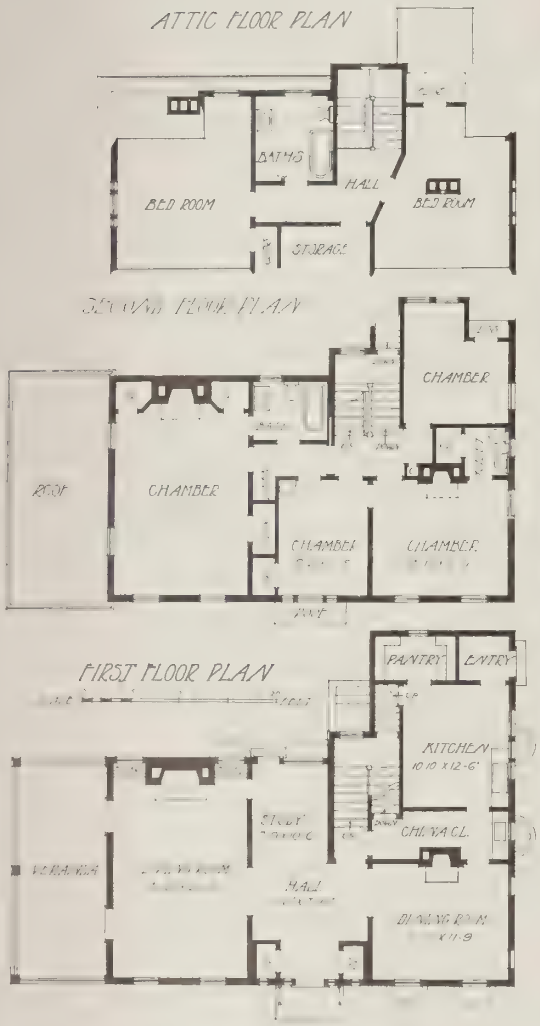
The per cent increase in cost of brick construction over wood and wire lath and stucco is as follows:

	Over Wood.	Over Wire Lath and Stucco.
Number one	12.71%	8.89%
Number two	4.63%	.91%
Number three	10.98%	10.64%

The per cent increase in cost of terra cotta blocks stuccoed construction over wood and wire lath and stucco is as follows:

	Over Wood.	Over Wire Lath and Stucco.
Number one	9.65%	5.93%
Number two	6.72%	2.92%
Number three	6.50%	6.17%

The clapboard houses are covered with best quality of spruce clapboards, laid 4½ inches to the weather, and painted three coats of lead and oil paint.



NUMBER ONE.

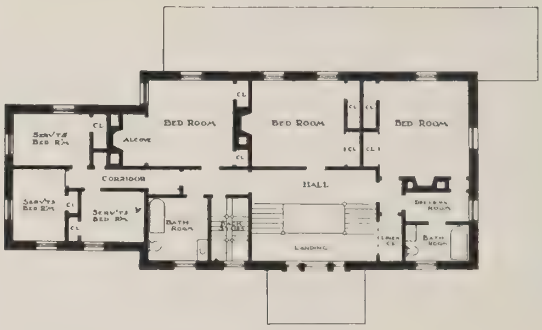
HOUSE AT CHESTNUT HILL, MASS.

Putnam & Cox, Architects.

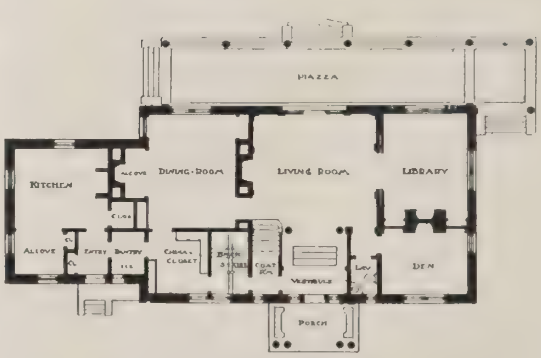
NUMBER THREE.

HOUSE AT WESTWOOD, MASS.

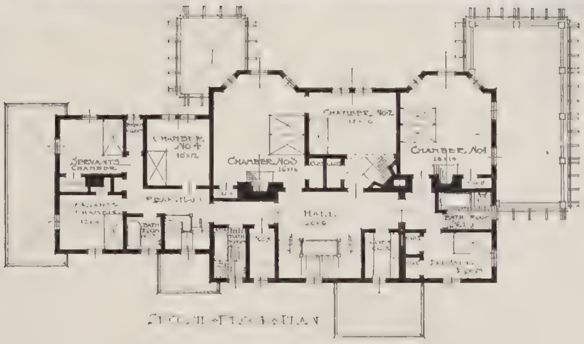
James Purdon, Architect.



SECOND FLOOR PLAN.



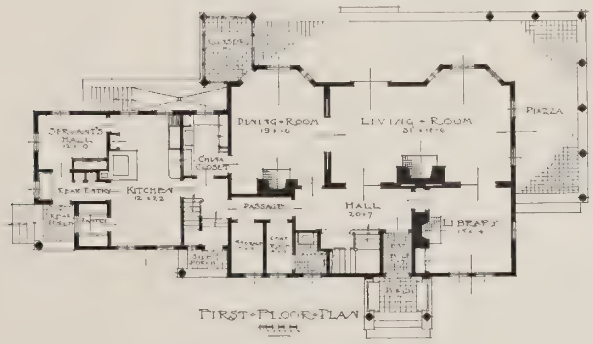
FIRST FLOOR PLAN.

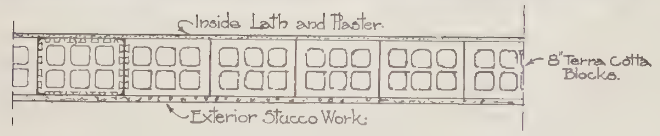


NUMBER TWO.

HOUSE AT MILTON, MASS.

George Hunt Ingraham, Architect.

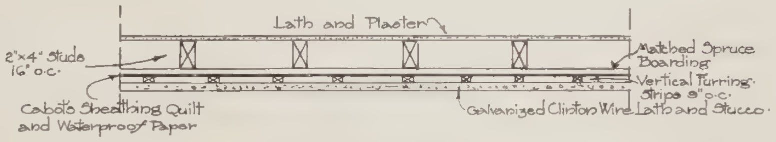




HOUSE NUMBER ONE.

DETAIL SHOWING WALL CONSTRUCTION.

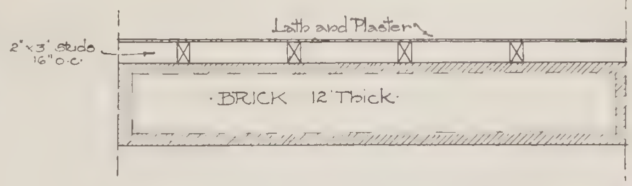
Putnam & Cox, Architects.



HOUSE NUMBER TWO.

DETAIL SHOWING WALL CONSTRUCTION.

George Hunt Ingraham, Architect.



HOUSE NUMBER THREE.

DETAIL SHOWING WALL CONSTRUCTION.

James Purdon, Architect.

The shingle houses are covered with clear sawed cedar shingles, laid 5 inches to the weather, dipped in Cabot's Creosote stain before laying, and brush coated one coat after laying.

House number one is built of terra cotta blocks stuccoed. House number two is built of wood frame, wire lathed and stuccoed. House number three is built of brick.

The types of exterior wall construction for the three houses are as shown in cuts a, b, and c.

INSURANCE. The insurance rates on the different types of construction are as follows:

TABLE III.

	Cost for 5 Years.	Cost for 15 Years.
Number one.		
Wood construction (wire lathed and stuccoed)	75c. per 100.	$182.25
Wood construction (siding, clapboards, shingles)	75c. per 100.	175.00
Brick	50c. per 100.	132.50
Terra cotta blocks stuccoed	50c. per 100.	128.70
Number two.		
Wood construction (wire lathed and stuccoed)	75c. per 100.	375.82
Wood construction (siding, clapboards, shingles)	75c. per 100.	371.25
Brick	50c. per 100.	256.87
Terra cotta blocks stuccoed	50c. per 100.	261.97
Number three.		
Wood construction (wire lathed and stuccoed)	75c. per 100.	442.91
Wood construction (siding, clapboards, shingles)	75c. per 100.	441.56
Brick	50c. per 100.	326.70
Terra cotta blocks stuccoed	50c. per 100.	313.50

REPAIRS. In estimating the cost of repairs, it is allowed that the wood house would need painting every three years after the first three years, besides general repairs to outside woodwork. The replacing of the shingle roofs is not included:

TABLE IV.

	Average Cost per Year for Painting and Repairs.	Total Cost for 15 Years
Number one.		
Wood construction (wire lathed and stuccoed)	$25.00*	$375.00*
Wood construction (siding, clapboards, shingles)	75.00	1,125.00
Brick	25.00*	375.00*
Terra cotta blocks stuccoed	25.00*	375.00*
Number two.		
Wood construction (wire lathed and stuccoed)	35.00*	525.00*
Wood construction (siding, clapboards, shingles)	100.00	1,500.00
Brick	35.00*	525.00*
Terra cotta blocks stuccoed	35.00*	525.00*
Number three.		
Wood construction (wire lathed and stuccoed)	35.00*	525.00*
Wood construction (siding, clapboards, shingles)	100.00	1,500.00*
Brick	35.00*	525.00*
Terra cotta blocks stuccoed	35.00*	525.00*

* These figures are for painting and repairs on exterior woodwork only. No attempt has been made to give the cost for upkeep of a wire lath and stucco wall. The efficiency of this type of construction, as is generally recognized, is dependent on the style of house, its location and exposure, quality of workmanship, quality of materials used, etc. But it is no exaggeration to say that in the matter of durability alone it will not compare with a wall built of brick or one built of terra cotta blocks and stucco, on either of which types the cost of upkeep would be very little, not only for 15 years but for a very much longer period.

COMPARATIVE COSTS AFTER FIFTEEN YEARS' OCCUPANCY.

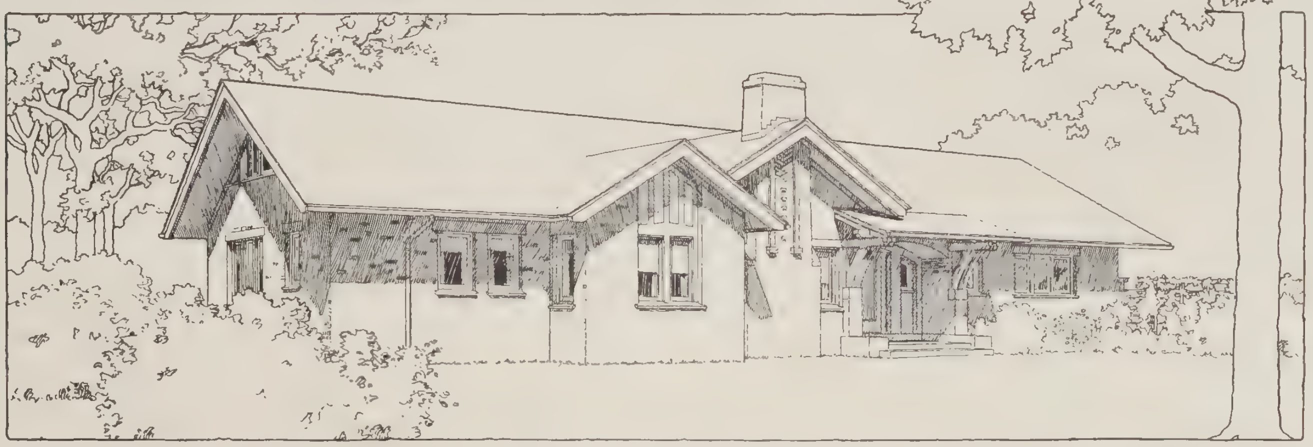
TABLE V.

	Number One.	Number Two.	Number Three.
Wood Construction (siding, clapboards, shingles).			
Original Cost	$7,800.00	$16,400.00	$19,625.00
Repairs	1,125.00	1,500.00	1,500.00
Insurance	175.00	371.25	441.56
Totals	$9,100.00	$18,271.25	$21,566.56
Wood Construction (wire lathed and stuccoed).			
Original Cost	$8,100.00	$16,970.00	$19,685.00
Repairs	375.00	525.00	525.00
Insurance	182.25	375.82	442.91
Totals	$8,657.25	$17,870.82	$20,652.91
5% Interest on difference in original cost over wood construction	225.00	427.50	45.00
	$8,882.25	$18,298.32	$20,697.91
Brick Construction.			
Original Cost	$8,820.00	$17,125.00	$21,780.00
Repairs	375.00	525.00	525.00
Insurance	132.50	256.87	326.70
Totals	$9,327.50	$17,906.87	$22,631.70
5% Interest on difference in original cost over wood construction	765.00	543.75	1,616.25
	$10,092.50	$18,450.62	$24,247.95
Terra Cotta Blocks Stuccoed.			
Original Cost	$8,580.00	$17,465.00	$20,900.00
Repairs	375.00	525.00	525.00
Insurance	128.70	261.97	313.50
Totals	$9,083.70	$18,251.97	$21,738.50
5% Interest on difference in original cost over wood construction	585.00	798.75	956.25
	$9,668.70	$19,050.72	$22,694.75

The figures here given, although not so favorable to the better type of construction as may be obtained in many other localities, furnish, nevertheless, evidence that more houses should be built with permanent construction, especially as the cost is so little in excess, and also that after fifteen years the repairs and deterioration on a wooden house are very much greater as the house grows older, while on the more permanent construction the repairs and deterioration after fifteen years remain practically the same year by year, to say nothing of the better salable value of the more permanent types. And, finally, from an artistic point of view, they add more dignity and tone to the vicinity in which they are erected. Also, the better types of construction are cooler in summer and warmer in winter, and require less fuel for heating.

THE SMALL HOUSE OF BRICK IN SUBURBS & COUNTRY — II

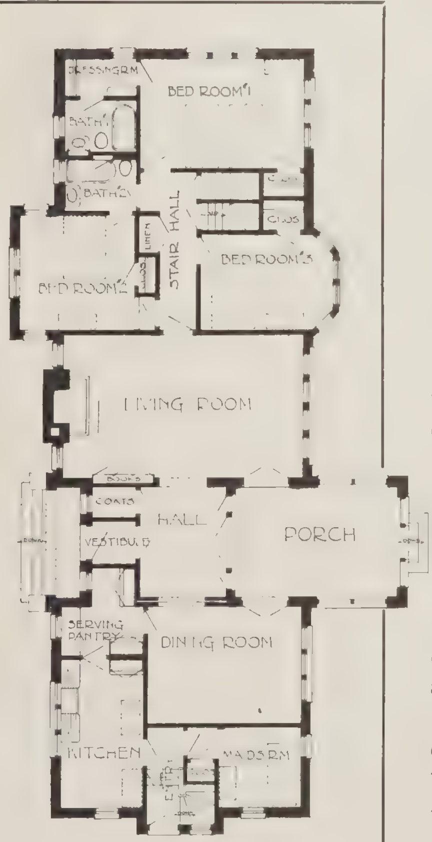
BY ROBERT C SPENCER JR.



BRICK BUNGALOW FOR A HUNDRED FOOT SUBURBAN LOT.

AS TO the planning and designing of small brick houses, there is little to be said which does not apply to domestic work in general.

Owing to the relatively complex bedroom floor arrangement of the very much closeted American house, the planning has grown more difficult with the growing demand for two or three bath rooms, instead of the *one* which was good enough fifteen or twenty years ago; a house must be planned after the general scheme has been roughed out, from the second floor *down* rather than from the ground *up*, in order to secure the maximum of compactness, simplicity, and convenience in arrangement. The architect's difficulties are increased in the case of a brick house by the fact that there must be more complete coincidence between the first and second floor plans than in the case of a house built entirely of frame, or of brick in the first story and frame above. The flexibility of the latter, which may be called the "Composite" type, is really a better justification for its adoption (aside from the picturesque "half timber" in combination) than any saving in cost over an all brick construction. This saving is, however, comparatively slight and in some cases disappears entirely. It often happens, however, that so much more space is really required for family needs on the second than on the ground floor that the overhangs easily obtainable in frame construction help out a great deal. This same result, however, can usually be obtained by placing the porches, at least the principal porch, within the outline of the second floor.



FIRST FLOOR PLAN

As to *plan*, there are three general types of the small house, each of which is illustrated herewith: the three-bedroom type with a bedroom at each corner and staircase occupying the fourth; the four-bedroom type with one or two bath rooms; and the four- or five-bedroom type. The last type has two or more bath rooms on the second floor and a small library or reception room on the first floor in addition to a hall, dining room, service quarters and relatively large living room, which have become the typical subdivision of the three- or four-bedroom type of American house.

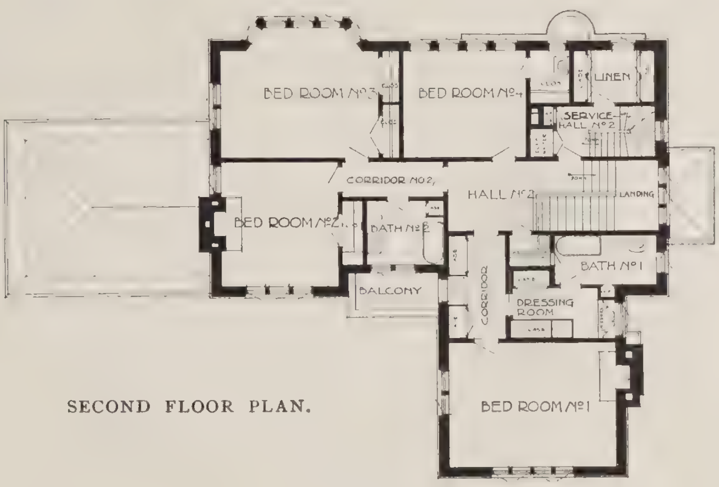
The roomy porch, often preferably planned for convenient use as an outdoor dining room, screened in summer and now commonly arranged for enclosing with sash in winter, is the one feature which particularly differentiates the American from the English modern suburban house. When properly planned and designed it adds not only to the apparent size and importance of the small house, but greatly enhances the charm and picturesqueness of the building as a composition. It mars the house only when built in the rather stupid and hackneyed manner still widely prevalent, as an exaggerated "lean-to" blanketing too much

FIRST FLOOR PLAN

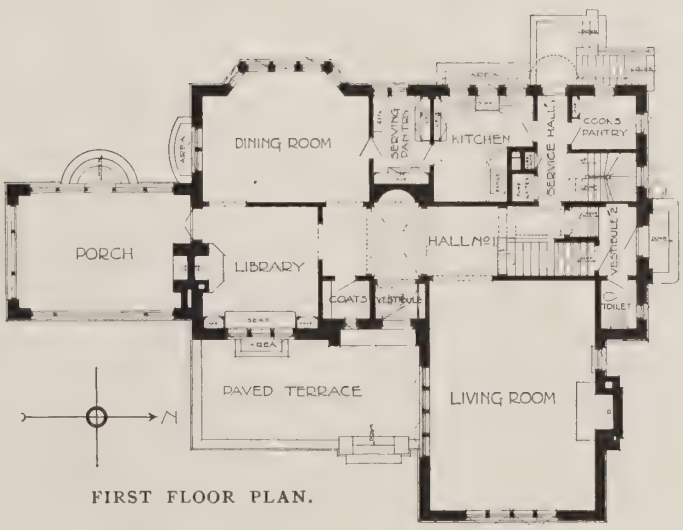
SECOND FLOOR PLAN

COMPOSITE BRICK AND "HALF TIMBER HOUSE AT OAK PARK, ILL. WITH SMALL SLEEPING PORCH.
COST LESS THAN NINE THOUSAND DOLLARS.

FIRST STORY WALLS, ROUGH, DEEP RED PAVERS IN GRAY MORTAR
ROOF, — LIGHT RED CLOVERPORT KY SHINGLE TILE.
STUCCO, — CREAMY BUFF.



SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

HOUSE AT RIVER FOREST ILLINOIS. WALLS, CHICAGO COM. BRICK FACED WITH DANVILLE ILL. KILN-RUN PAVERS LAID IN PALE RED MORTAR.

BASE, SILLS & COPINGS, BUFF BEDFORD STONE.

ROOF, LIGHT ROSY RED KENTUCKY SHINGLE TILE.

ALL WINDOWS, ORNAMENTAL GLASS IN ZINC BAR WITH ROSE MOTIF IN DULL AMBER AND IRIDESCENT GLASS.

LIBRARY FIRE-PLACE BELOW.

A FIREPLACE OF ROMAN BRICK SHOWING THE EFFECTIVENESS OF A BROAD, QUIET TREATMENT WITHOUT THE HACKNEYED SHELF AND OTHER USUALLY OVERDONE DETAILS

TALLMADGE AND WATSON ARCH'TS.

of the building and cutting off too much of the needed winter sunshine from the rooms within.

Another characteristic feature is the so-called "sleeping porch," or outdoor bedroom, which in the small house may be just large enough for one or two cots or a hammock.

Starting with a well-proportioned plan lending itself to a simple, quiet scheme of roofing, the character of the house design is largely determined by the character of the fenestration, by the type, pitch, and overhang of roofs, by the treatment of the eaves and gables, and by the use made of the possibilities of wood and stucco in combination with the brickwork.

As to fenestration, the bias of the designer will largely determine its character. The writer has always particularly favored casement windows arranged in mullioned groups rather than as individual formally spaced upright openings in the masonry. The former give broad pictures of the attractive views to be had from within which would be unpleasantly broken at the eye level by meeting rails. They also give freedom and simplicity, particularly to an informal composition. Where English casements are used they afford the maximum of warm weather ventilation, lending themselves readily to the use of Venetian blinds folding into overhead pockets, for openings much exposed to the direct rays of the sun. These broad mullioned openings in brickwork are economically spanned with steel angle lintels, or lintels of timber may be used as a substitute if resawed from old weather-seasoned stock after the common old English fashion.

One of the many charms of brick is the readiness with which, for the small house, it may be structurally combined with wood. Except for certain individual features, such as entrances and small porches, arches are more expensive than lintels and unless carefully placed and studied they tend seriously to disturb the composition.

In many cases the roof pitch, high or low, a powerful element in house expression, may be determined largely by the bias of the architect.

Inasmuch, however, as a house with a given plan, considered apart from closely neighboring buildings, may be designed to look just as well with a roof of sharp pitch as with low roof lines, the question should be largely one of utility, particularly in the small house where space must be economized. Where the owner's requirements as to bedroom space are small a low roof-pitch affording just enough attic for storage purposes is sufficient, — the servants' bedroom and bath being located either on the first or second floor. Where the required bedroom accommodations are large in proportion to the building appropriation a gabled roof is naturally indicated with a good pitch for space, the gables providing ample light and cross ventilation with a minimum number of dormers. The designing of gables in brick where ample attic fenestration is needed requires careful study and affords opportunity for no little ingenuity. In most English houses the difficulty is avoided by placing small windows only in the gables, or omitting them entirely, the attic spaces not being considered of much importance.

Stucco, or wood and stucco, may often be used with good effects in the gables of a brick house where the eaves overhang. It is also a more substantial looking soffit covering than wood. While the difference in cost is probably small, the treatment of gables with stone or tile copings instead of overhanging verge boards tends to give a somewhat severe and formal look to the small house, although perhaps the most simple and logical treatment for solid masonry walls.

No one feature of the small house offers wider scope for ingenuity and good taste in design than the living-room fireplace. Many different interesting designs are possible in brick alone, the possibilities increasing with the use of wood, stone, tile, cast-cement and stucco composition for decorative effect.

'A SMALL BRICK AND STUCCO HOUSE IN ROCHESTER, N.Y. BASE & SILLS ARE OF BRICK ON EDGE.

DESIGNED BY CLAUDE F. BRAGDON.

Since the average owner seems to have a fatal predilection for overloading *her* fireplace or so-called "mantel-shelf" with miscellaneous bric-à-bric, it is not a bad scheme to omit the shelf entirely wherever no serious opposition is offered. If the owner insists upon the shelf for a brick fireplace, let it be of stone or cement, as the cost will be little more than that of wood.

For paving terraces and the floors of porches, bricks laid in cement mortar on a good bed of concrete are less expensive and rather more harmonious for the brick house than quarry tiles. Good cement pavements cost about ten cents less per square foot than Roman bricks laid flat in herringbone or basket patterns. Although smoother and easier to keep clean than brick, cement is less desirable, particularly for surfaces exposed to the sun, as it reflects too much light and heat during our hot summers and tends to mar the quiet color harmony which results from the use of burned clay, not only for the exterior of the house, but for its outdoor accessories as well. For the same reason the walks about the grounds should also be of brick. Many suburban and country places are seriously marred by the hard, glaring, white lines of the too popular cement walk. A fairly true paver, laid flat on concrete with the joints well grouted with liquid cement, is not at all difficult to keep clear of snow in winter, a general prejudice to the contrary notwithstanding.

For very small places where the strictest economy must be observed, brick paving, not only for walks but for porches and terraces, may be laid on a bed of sand or fine gravel and the joints filled with fine sand, to be grouted if desired at some future time with cement after all danger of further settlement has passed.

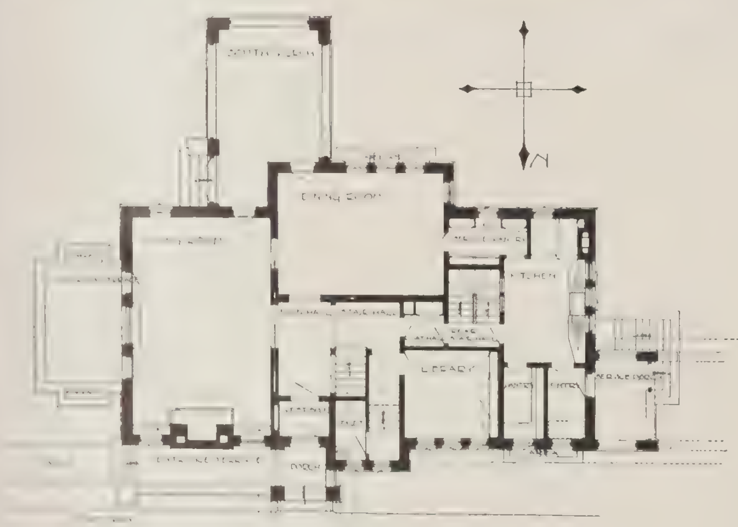
Perhaps the most difficult question in connection with this subject of brick house building is that of cost. There are such wide variations in local conditions as to costs of materials and labor, so many possible variations in design and selection of material which affect cost, that every architect must depend to a large extent in casting his horoscopes for brick-loving clients upon his own past experience.

To say that a frame house may be redesigned without essential change of plan and built of brick for an additional cost of ten to twenty per cent over the cost of frame construction, does not give the owner of limited means quite as definite advice as he would like to have. Yet it is not wise for the architect to be more definite until working plans for either the brick or frame house have been prepared and the contractor's estimate obtained, showing more definitely the difference in cost involved in the proposed change of material.

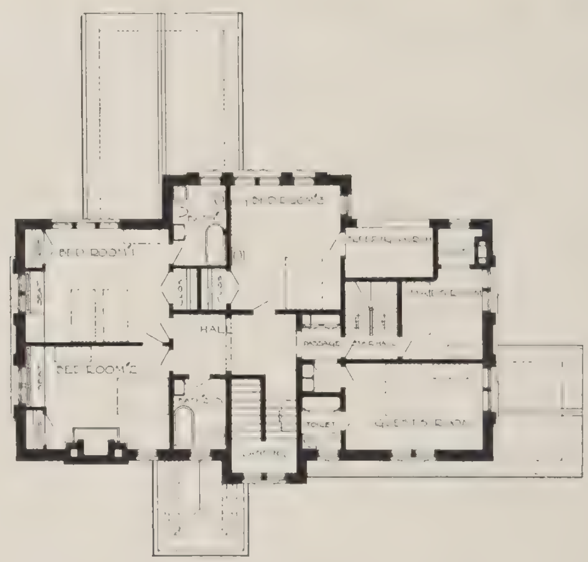
In the vicinity of Chicago the cost of building identically the same house varies considerably. As between the "North Shore" and the western suburbs it averages at least ten per cent more in the former section. The writer knows of cases where during the past year good frame and stucco houses with shingled roofs cost as high as 22 cents per cubic foot on the North Shore, whereas during the year previous a very thoroughly constructed and finished solid brick house with shingle tile roof was built in a nearby *western* suburb at 24 cents per cubic foot.

It would seem that the longer the architect specializes in residence work, the more difficult it becomes for his clients to pin him down to definite advance statements as to cost. Clients whose appropriations are limited usually *want* and ultimately *pay* for buildings costing from thirty to fifty per cent more than the amount of the appropriation to which they limit the architect when authorizing him to prepare preliminary sketches. They dare not be frank.

We are often asked if the cost of building in brick is likely to grow materially less in the future. It would



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

HOUSE AT SHELBYVILLE, ILL.

SPENCER & POWERS,

ARCHITECTS.

House at Shelbyville, Ill., walls faced with red Danville shale brick in pale red mortar. Roofs, Cloverport shingle tile. Stucco, creamy buff, float finish. Outside rough timber work, etc., stained a warm brown. Terrace and porch floors of Welsh quarry tiles.
The boldly projecting living porch connects living and dining room without darkening them.
The unusual treatment of the gables avoids the usual baldness of the all brick gable and provides for large windows lighting bedroom, store room, and billiard room.

seem that the only hope in that direction is in the increased skill and efficiency of average brick masons and in the growth of their numbers. In the meantime the cost of frame construction will continue gradually to advance, until it so nearly approximates that of brick that the latter will be chosen regardless of the small difference in cost, because of its many superior qualities.

In small or remote places it is easier for an architect to superintend the construction of a frame than a brick house.

In many small towns the carpenter is often the only competent builder capable of reading plans and building the special designs of the city architect without serious mistakes, his business requiring that he himself be an architect to the extent of drawing plans for the average small house of his town.

The work of the village mason is mostly confined (at least in the middle West) to the building of basement walls and chimneys, and more often than not he depends upon the carpenter for the correct laying out of his work, being incapable of reading plans correctly himself. His methods are sometimes so wofully slack, that taken together with his other shortcomings and those of the village carpenter, the architect and owner are indeed relieved when he is finally off the job.

A little personal experience in connection with the building of a brick house last year in the Illinois "Corn Belt" has its laughable side, the humor of which did not particularly appeal to us at the time. There being no clerk of the works on the job the stone water table was laid at grade and the walls run up to first floor between visits. Owing to lack of "team-work" between carpenter and mason (the former having studied the plans nights until on the verge of nervous prostration) the joists were found all set about five inches too high, brick courses out of level, and water table two inches "off" between front and one side. On cross examination the carpenter was proven an accessory to the crime as to joists through failure to check up on mason. The mason was found guilty as to water table, having interpreted the specification-clause "accurate measuring and leveling instruments" to mean the following: Fifty feet of rubber hose, two men to operate ends of same around corners of building, and one large tin cup with which to replenish water escaping from hose, said hose being very old and leaky. A sensitive "leveling instrument" indeed when full and stationary, but its accurate reading was nullified owing to said leaks and diverted attention of operator while trying to offset leakage with water from the tin cup.

While no amount of close personal supervision will secure first-class workmanship from careless or incompetent mechanics, the employment of a clerk of the works, at least until completion of the mason's work would have resulted in a much more satisfactory job — with a saving of worry and trouble to both owner and architects. The architect or his superintendent seldom sees the work often enough.

When bad brickwork has been run up in his absence, he can only order it torn down and relaid, and relaid brickwork is seldom as satisfactory as that which is done properly as it progresses.

HOUSE AT

GARDEN CITY, LONG ISLAND, N. Y.

Aymar Embury, 2d, Architect.

Walls of Hollow Tile with Stucco Finish.

Legal Hints for Architects.—Part V.

WILLIAM L. BOWMAN, C.E., LL.B.

DUTY TO CONTRACTOR.

IN HIS whole-heartedness and sincerity in serving his employer, the architect sometimes fails to remember that by superintending the construction work he has assumed certain obligations to the contractor. These obligations vary somewhat in the different jurisdictions of the United States on account of conflicting legal interpretations of the building contract clauses, but in general the principles involving the architect are almost universal. While as the interpreter of the plans and specifications he is generally considered the agent of the owner, yet he is sometimes considered the mutual agent of both the owner and the contractor, and sometimes an arbitrator. Under any of these relations he can only demand or require what the plans and specifications actually specify and not what he thinks they should call for or what he may have intended they should require. The language used in the specifications should be given its usual and ordinary meaning save when it is used in a well-known technical sense. Where the architect is a mutual agent or an arbitrator he practically assumes a judicial function and his determinations and decisions which often are binding and final upon the parties should be governed by the same principles of honor, integrity, and justice which we expect and demand from our judges on the bench. Since many of the questions upon which he may be called to determine may be due to his own mistakes, omissions, or negligence, and since he may by a decision in favor of the contractor lose not only his compensation but any future employment, the architect occupies a unique and questionable position in the possible legal relations among men. There are many who do not believe that any person should be put in such a position where there is a premium upon wrong doing and deciding wrongly, and this is especially so where there is no possibility of punishment for such action, the architect not being reponsible at law either for want of skill nor even for negligence when acting in this capacity.

Regarding the making of estimates and the issuing of certificates the architect is almost universally considered as an arbiter whose decision is binding and final except where bad faith, fraud, or collusion can be proven by a preponderance of legal evidence. This raises the question as to what is sufficient evidence to enable a contractor or owner to be relieved from the architect's certificate. While there is some difference of opinion on the subject, there seems to be a general consensus that an arbitrary or unreasonable refusal to issue an estimate or certificate is of itself fraud. So a refusal upon grounds known to be fictitious or without foundation; where a mistake in estimating or of opinion is so absurd or ridiculous as to be palpable; where stone furnished in strict accordance with the specifications have rusted to some extent; where there is collusion with the owner, or in other words, obeying the owner's orders not to issue estimates or certificates; where the contractor has not done something not required by his contract; where there has been a substantial performance of the contract; refusals on such grounds or under such circumstances have each been held to amount to fraud on the part of the architect and to entitle the contractor to recover for his work without the production of such architect's certificate. On the other hand, bad faith or fraud has been held not to be shown where a certificate has been given when as a matter of fact the work specified in the contract lacked a few dollars of completion; nor where defects are discovered in the work after the certificate has been given; nor where the quality of the work is poor unless the judgment of the architect was not fairly exercised; nor by mere incompetency or negligence of the architect unless the same is very gross.

Where payment is conditional upon the architect's certificate and where there is a requirement that the architect *shall make* a monthly estimate, nothing should prevent the issuing of some kind of an estimate if any work is done, even if the owner's orders are to the contrary. I have known of instances where without any contract provision the architect has arbitrarily held up his certificate until the time within which mechanics liens could be filed had passed; or where because of some trivial dispute involving a few hundred dollars, a payment of thousands is arbitrarily held up although the owner might have other thousands in retains in his possession; personally this seems to be nothing short of blackmail in the way that it is sometimes worked. Before leaving this subject there is one such striking example of what an architect ought not to do that I shall give the facts in some detail so that it may help others should they ever become involved in a similar situation.

A contractor entered one of those cut-throat contracts perpetrated by municipalities and others, with ancient specifications, as loose and ambiguous as could be imagined and containing all the saving clauses conceivable. By the contract itself, the work was to be done under the direction of a certain official and to his satisfaction, while the general conditions of the specifications put it under the direction and to the satisfaction, approval, and acceptance of the *owner* and the architects. The contract made the decision of the official and the architects final as to the true meaning and construction of the drawings and specifications; the specifications required all questions of that nature to be referred to the architects, whose decision had to be accepted as final and conclusive and without appeal. According to previous decisions in the jurisdiction such a clause made the architect's power absolute. Work was started with an inspector of the owner and another of the architects daily upon the ground; the architects personally made weekly and the officials about monthly visits. Certain materials were rejected and others required; work was taken out and replaced until the contractor had in his opinion completed the entire undertaking. The contract further provided that payments

should *only* be made upon the architects' certificate, and that on or about the first of the month an estimate should be made by the architects "of the relative value of the work done and materials furnished and accepted, *to be judged of by them*," and also that as each building was completed and accepted *by the owner* a certificate for the payment of the retained money on that building should be made. Throughout the work the monthly estimates and certificates were made and paid until the last two months. After all the many thousand feet of finished flooring had been laid and varnished, presumably to every one's satisfaction, the official made one of his monthly visits, and, although there was no requirement, that the pine flooring should be matched nor that only a certain length butt was essential, he raised a row and refused to accept the flooring because of its failure to please his hitherto unknown personal taste in these regards. At the same time the window glass was very severely criticized and any light with the slightest or most minute air bubble, etc., was ordered rejected. Other minor items were ordered changed. Although the contractor during the construction had already sunk a couple of thousand dollars to correct mistakes of the architects or their clerk of the work, and to supply omissions in the specifications, and in his general view of making the job one of his best for purposes of advertisement, yet he decided to assume the additional burden of reasonably satisfying the personal tastes of the official. Many hundred feet of flooring was replaced, thousands of lights changed and all of the minor items corrected, although the furnishers of the various materials were ready and willing to stand by them as being within the specifications. Time for an estimate came, then for a payment, but neither was forthcoming although a large amount was due for other classes of work completed, such as mill work, hardware, plumbing, etc., regarding which there never was any question raised then or thereafter. Another month of work passed with no estimate nor payment. By this time the contractor had completed his undertaking and done all he could reasonably to comply with the official's complaints. The inspector for the owner, a practical builder, then made his certificate of good and substantial completion of the entire contract.

From the first complaint of the official the architect in charge completely reversed himself, and where he had previously expressed himself as well pleased with the work and issued certificates upon practically all the particular work complained of, thereafter he would do nothing except follow blindly each and every order of the official.

Acting under such instructions the architects refused to issue certificates either for the monthly work or for buildings completed, one of which was even occupied. Regarding the completed buildings previous to the last, both the official and the architects failed to note that the retains were payable upon the *owner's* acceptance and not the *official's*. Certainly such acceptance was shown by the certificate of the owner's inspector, and this in addition required the architect to act in this regard. Again, during the work some extra work was done which was ordered so that the contractor could be paid for it. The contract required payment for such work to be made the same as for the regular work, but the architect failed to issue his estimates or certificates and of course no payments were made. Although the personal tastes of the official only affected two of five separate buildings and involved at an exorbitant estimate not more than $1,000, and although the owner had $14,000 in retained percentages beyond the $6,000 actually due, yet the architects absolutely refused to do anything for the contractor on their own part, nor could the official be persuaded to help the contractor out with the needed money long past due under the express terms of the contract.

When the architect in charge was informed that his action amounted to a fraud upon the contractor he was truly indignant, and as an excuse for the refusal to do anything stated that he was acting under orders of the official, thus admitting the fraud in his own statement of denial. As other excuses for his attitude he stated that he was employed and paid by the official and not by the contractor, and that therefore he did not have to consider any suggestions or demands of the contractor; also that if the official wanted to pay, he could do so without their certificate. Of course the official was to blame for the situation, which was chiefly caused by his deliberately ignoring the terms of the contract and specifications and by his lack of building experience. The architects, however, by issuing their estimates and certificates as required by the contract, could and should have done their duty by the contractor and at the same time upheld their own professional ethics and manhood, if it might be so called. The real trouble with them was that the official had future building operations in his hands which the architects felt they could secure and control provided they did nothing to cross him, so that for the sake of future work they sacrificed their professional honor.

The position which an architect should assume in such circumstances has been well expressed in the following judicial statement: "I cannot come to the conclusion that the architect's sole duty was to protect the interests of the building owner against the builder. I think that . . . he owed a duty to the builder as well as to the building owner. The effect of his agreeing to act . . . was that he undertook the duty towards both parties of holding the scales even and deciding between them impartially as to the amount payable by the one to the other."

The example last given may be cited also as an instance of the failure of some architects to recognize a well established legal and equitable doctrine that the architect is charged with the duty of accepting or rejecting material or workmanship as soon as there is a reasonable opportunity for inspection of it. Where the architect or his inspector is daily on the job a reasonable time in which to decide such matters is limited to a reasonable time for proper inspection. Failure to object, condemn or reject material or workmanship seasonably and in the manner contemplated by the usual contract operates as a waiver of defects in regard thereto and as an irrevocable acceptance of such material or workmanship as satisfactory under the contract. Why should this not be so where the architect can order any material away and secure the dismissal of any man on the job whose work or personality is not acceptable to him? Most of the courts of the country hold that this is an equitable and just doctrine, because the owner stipulates for inspection and approval as the building is constructed and for a representative of his own to compel compliance

with the contract at every step, and if the architect fails to perform his duty the loss should fall upon the owner and not be shifted to the builder, who may have been lured into the belief that his workmanship and material were satisfactory until too late to remedy defects therein without serious loss. Architects then should be guided in their superintending work by the theory that "when the architect is present and has knowledge of the character of the material being placed in the improvement without objection at the time, his conduct is an approval of the same which cannot be revised by him to the prejudice of the contractor."

The experienced architect is now saying to himself, how about the contract clause that no certificate save the final is conclusive nor an acceptance of improper materials or defective work? Yankeelike my answer is, What are improper materials and what is defective work? Improper is defined as "not suitable," "not fitting to the design or end." Thus where ⅞ inch pine flooring is called for by the specifications, and the contractor, logically assuming that for a public charity building trade 13/16 inch and not special ⅞ inch is meant, orders the former, which is duly inspected, accepted, and laid, certainly no one could honestly hold that such flooring could be rejected as not suitable or as unfit for the building. Similarly, where long leaf flooring is put in a building under the same circumstances, short leaf being called for by the specifications, would any fair-minded architect desire to go on record that such was an improper material?

Defective work may be defined as that work which is "wanting in something," "incomplete," or "imperfect." This phrase must however be considered in connection with the requirement as to the character or workmanship demanded. The type or class of building must also help determine this question. Where the contract merely required a "workmanlike manner," it was held to require only sufficient skill to conform to the received rules of the art and so as to *proximately* effect the desired end. "Plain, substantial, and workmanlike manner" implies that the work shall be done perfectly *for the character of the job* contemplated; while a "good and workmanlike manner" requires the work to be done in a manner generally considered skilful *by those capable of correctly judging such work*. The common failing in this regard is a neglect to consider the kind, character, and cost of the building involved; for example, a first class floor for a stable should not be required to equal a first class floor for a mansion on Fifth avenue. While there is some conflict of authority as to what extent the clause regarding acceptance permits the rejection of incorporated work, it would seem that when it is considered to be consistent with the usual progress estimate or payment clause, such a clause does not prevent the progress estimates or certificates from being conclusive as an acceptance of the estimated work and as to patent defects therein. Such seems to be the usual and reasonable construction of the ordinary building contract. Of course the situation is entirely different where there are latent defects not discoverable with reasonable inspection or where the contractor purposely and intentionally attempts to and does deceive the architect or his inspector. In such cases it is proper and the duty of the architect upon discovering such defects to order its removal and correction. Again, this rule will not cover those cases where the contract has special clauses regarding what kind of work may be ordered removed or replaced even after incorporation, but such special requirements will be very strictly interpreted, hence the architect must be assured of their significance before making or taking any serious step thereunder.

There is one other duty of the architect towards the contractor that needs some consideration, and that is the ordering of alterations, additions, or extras. While these words are to many synonymous, yet in some jurisdictions they have entirely different legal meanings: alterations being actual changes made in the specifications which ordinarily are not covered by any requirement of the contract or specification as to the method of ordering, etc.; additions being work necessarily required in the performance of the contract, not intentionally omitted from the contract and not reasonably implied therein, and yet evidently necessary to the completion of the work; and extra work being work outside of and entirely independent of the contract and not required in its performance. The building contract does not always consider these distinctions in the jurisdictions that make the distinctions, and this often causes the architect trouble not only with the contractor but with the owner. The architect's authority in this regard will be later considered, but here it should be noted that to be on the safe side and to properly protect the contractor the architect should give a written order for everything that he orders, whether it be alteration, additional, or extra work, otherwise the contractor may do the work and later find that since the architect only ordered it orally he cannot recover or get his pay for the same. There seems to be a marked policy on the part of some architects to issue as few written orders as possible, but they should realize that in so doing they are acting dishonestly. If the contractor is entitled to compensation beyond his contract price a written order should be given, and if on the other hand the architect considers the work within the contract he should give a writing anyway, stating that to be his opinion and ordering said work to be done pursuant to such opinion. Then if occasion arises both parties have a memorandum of the circumstance which may prevent serious conflict of oral testimony.

Summarized briefly, the architect's chief duties to the contractor demand correct and honest estimates or certificates of payment at the time called for by the contract, based upon his personal architectural knowledge and experience; such superintendence and inspection as the work requires to obtain determinations regarding the materials and workmanship before or at the time of incorporation into the improvement; and written orders or instructions regarding alterations, additions, or extras, especially where there is a difference of opinion on the part of the contractor. These considerations show that the architect's duty to the contractor is largely determined by particular clauses in the building contract, and hence if serious conflict becomes imminent the architect should at once seek good legal advice, otherwise he may not only seriously involve the owner, financially embarrass the contractor, but become personally responsible for his unauthorized and unjustifiable conduct.

Plate Illustrations—Description.

Chapel, St. Louis, Mo. Plates 141–143. In planning this "community" Chapel, the architects were privileged to work in conjunction with the Mother Superior of this order lately driven out of France. The brick upon the exterior is a mottled gray taken at random from "culls," giving a resultant tinge of the gray monotone with suggestions of yellow and pink. It is laid up in natural colored mortar with wide weathered joints horizontally and close water-struck joints vertically. The trimmings are of buff Bedford stone. Upon the interior the floor is of pink Tennessee marble with honed surface and in general effect unites with the slightly yellowish natural rough plaster to give warmth to the otherwise undecorated nave and side aisles. The gallery rail in wrought iron is painted a dark green, flecked with a lighter green, while the ceiling rafters of the gallery are of dull dark oak. The benches are replicas of those in the Mother Chapel at Paris and the glass is especially designed, undecorated and baked like the French grisaille. The chancel rail of wrought iron is flanked by the two "Ambons" of marble inlaid with Tiffany glass mosaic. The altar is also of marble inlaid with glass mosaic and illuminated with vertical mirror angle reflectors concealed behind the pilasters. In the rear are the sacristies fitted with vestment cases and the working rooms for the Sisters. The building cost when completed $23,000 and contains 87,204 cubic feet reckoned from the ground only, as the foundations were in place and the new work began with the first floor. The price per cubic foot was approximately 26.4 cents.

The Field House and Gymnasium, Chicago, Ill. Plates 149, 150. The Hamlin Park improvement is one of several small parks recently established in the Lincoln Park district. It is the largest and most complete, providing all the facilities and appurtenances which have been accepted as a part of an institution of this kind in its latest development. The total area of the park is approximately ten acres. In addition to the large athletic field is provided a separate outdoor gymnasium for men, women, and children, indoor gymnasiums, one for each sex, an assembly hall, club rooms, a branch of the Chicago Public Library, locker rooms, toilet rooms, shower baths, and an outdoor natatorium with accessories which are capable of accommodating the maximum capacity of 5,000 per day. This institution is operated on an entirely free basis, — lockers, towels, bathing suits, soap, etc., being furnished free to each applicant and thoroughly laundered after each use. The assembly hall is given for free use upon written application. The buildings are entirely of pressed brick and terra cotta both inside and out, the exterior being of a dull red wire cut brick and the interior of a smooth impervious yellow brick. The roofs are of green glazed tile. The total cost was $100,000.

The New Ashland School, St. Louis, Mo. Plate 151. The building is faced with a mixture of ordinary hard and red brick in appropriate mortar color, and roofed with slate. The site contains 138,884 square feet and the building covers an area of 22,700 square feet. Deducting the area of the building and the planted section in front, the playground contains 58,376 square feet, or 48.64 square feet per pupil. The normal capacity of the building is 1,200 pupils. Upon the interior the finish is of oak and the floor of maple. The main corridor on each floor is 14 feet wide and the secondary corridors 8 feet wide, all receiving direct outside light. In order to prevent loss of time by the pupils during school hours, a limited number of toilet fixtures are placed on each floor in the four toilet rooms. Each class room is 24 feet by 31 feet 6 inches, unilaterally lighted, and provided with wardrobes 5 feet 3 inches by 16 feet. The building is heated and ventilated by the steam plenum system. Fireproof construction is used throughout with the exception of the roof. The basement story is 11 feet 8 inches in height, and the first and second stories 12 feet; the windows being carried directly to the ceiling. The cost of the building complete, ready for equipment of furniture and including the improvement of the site, was $189,519, making the cost per cubic foot 16.2 cents and the cost per room $7,897.

The New Franklin School, St. Louis, Mo. Plate 152. The site, 61,624 square feet, being restricted in area and located in the city district, made it advisable to erect a three-story building. The plan covers an area of 30,613 square feet, which leaves 25,449 square feet for playground and planting area or 19.6 square feet per pupil. The location of this building with reference to the surrounding schools made it advisable to provide several features not ordinarily included, namely, shop capacity for a double manual training and domestic science center and an auditorium. The building has been arranged for both day and night sessions. Upon the interior the finish is of oak and the floors of maple. Four stairways are provided, two of which lead from the ground floor directly to the third floor and are enclosed in wire glass and metal partitions from top to bottom. The auditorium is 60 feet by 90 feet and provided with galleries opening on the first floor corridor, which permits of its use independent or with the school. The room is well lighted and capable of seating 1,300 persons. The building is fitted with fixtures for electric lighting, with synchronizing clock and bell system, and house telephones intercommunicating between the principal rooms. The boiler and fuel rooms, ash pit, etc., are located just outside of the walls of the main building, well lighted and accessible. The building is heated and ventilated by the steam plenum system, and of fireproof construction throughout. The basement is 14 feet 3 inches in height, and the first, second, and third stories 13 feet 3 inches high, all in the clear, the windows being carried directly to the ceiling. The cost of the building complete ready for furniture and including the improvement of the site was $209,987, making the cost per cubic foot 17.1 cents and per room $8,076.

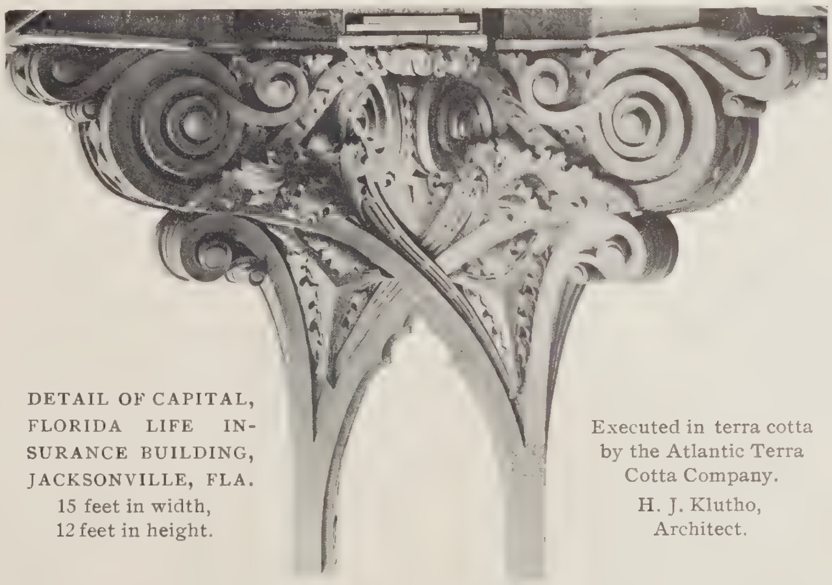
The New Meramec School, St. Louis, Mo. Plate 153. The building is faced with ordinary hard and red brick in appropriate mortar color and the roof laid in tile. Deducting the building area of 12,536 square feet, and the planted section in front, the total playground approximates 48,251 square feet, or 87.5 square feet per

pupil. The plan is arranged so that the east and west wings may be lengthened, providing four additional class rooms. The normal capacity of the building is 550 pupils. Upon the interior the finish is of birch with maple flooring. The main corridor on each floor is 14 feet wide and the secondary corridors 8 feet wide, all receiving direct outside light. The nine class rooms are 23 feet by 31 feet, unilaterally lighted and provided with wardrobes 5 feet 3 inches by 16 feet. The building is heated and ventilated by the steam plenum system, the air being washed before passing to the heaters and fans. Thirty cubic feet of air per minute is supplied to each pupil, the apparatus being designed to furnish from eight to nine changes of air per hour in the class rooms and four changes per hour in the corridors and play rooms. Foot warmers will be installed in the ground floor corridor. The building is of fireproof construction throughout with the exception of the roof. The basement story is 11 feet 8 inches in height, and the first and second stories 12 feet, the windows being carried directly to the ceiling. The cost of building complete was $119,989, making the cost per cubic foot 18 cents and the cost per room $7,999.

Editorial Comment and Miscellany.

WORKINGMEN'S HOMES IN BERLIN.

THOMAS A. EDISON in a recent interview for the New York *Times*, referring to the home life of the working people in Germany as compared with those in America, draws quite a contrast between Berlin and New York City. He says that the buildings which the workingmen of Berlin occupy are not "tenements" similar to those which disgrace and deface New York's crowded districts, but are fine apartment houses, beautifully constructed, perfectly supplied with light and air, safe against fire and made up of large and conveniently arranged rooms. Each story has its iron balconies, generally filled with flowers. In America, however, flowers upon the balconies are violations of the law for they might obstruct their use as fire escapes. In the German city the flowers do not imperil human life, since the buildings are constructed of good materials and really fireproof. Mr. Edison cites the rentals as extremely moderate, proportioned to the incomes of the men who live in them far more reasonably than are the rentals of the much less desirable apartments which men of the same walks of life must use in American cities. There is no overcrowding — absolutely none. He claims that the laws in the United States, providing that each resident of such a building shall have certain air space, that all apartments shall have certain light and ventilation, and that certain precautions against fire loss shall be taken both in management and construction, are not strictly carried out. In Germany, however, law means law and is enforced.



DETAIL OF CAPITAL, FLORIDA LIFE INSURANCE BUILDING, JACKSONVILLE, FLA.
15 feet in width,
12 feet in height.

Executed in terra cotta by the Atlantic Terra Cotta Company.
H. J. Klutho, Architect.

A HOME FOR ART, NEW YORK CITY.

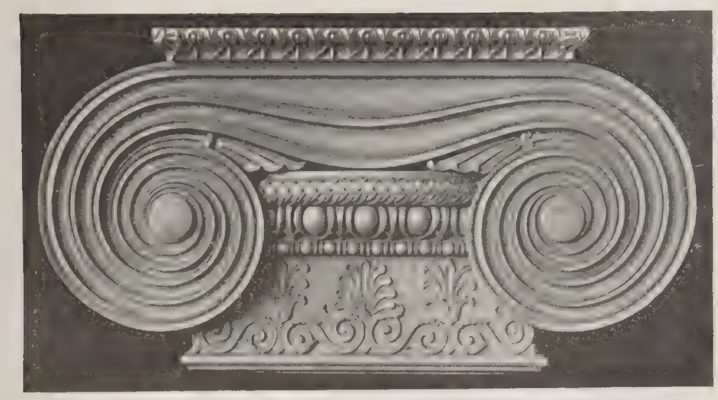
A NEW National Academy Association has been formed in New York City with a prospective fund of $1,500,000. The aim of the society is to erect a new and suitable building on an eligible site for the allied arts. The members of the new organization include the Academy of Design, the Water Color Society and Water Color Club, the American Institute of Architects and the Architectural League, the Sculpture Society, Municipal Art Society, Mural Painters and Illustrators. The Mayor, the members of the Chamber of Commerce, the directors of libraries, and members of the Metropolitan Museum of Art have been invited to co-operate. All the great exhibitions will be held in the new building, which will also contain a permanent exhibition of American Art in all its branches. This is the first tangible result of the many efforts to provide an art center for the metropolis.

NEW HOSPITAL AT PARIS.

THE De La Nouvelle Pitie Hospital, Paris, which was begun in 1905 and recently completed, consists of a series of buildings for medical and surgical treatment, together with a maternity hospital. The buildings cover a plot of ground approximately 600,000 square feet, built of brick and connected throughout by an underground passage. Each building has a separate underground passage connecting with the kitchen through which meal trucks pass to the various lifts fitted in all parts of the hospital. The hospital has about 40,000 square feet of courts and gardens. It can accommodate 1,000 in-patients and cost approximately $2400 per bed. The architect of this group of buildings was M. Justin Rochet.

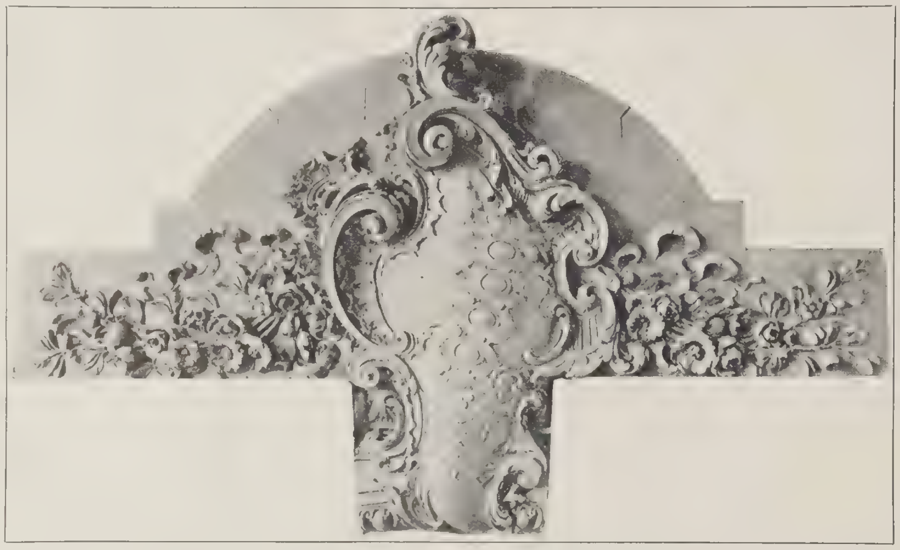
"BROADWAY GARDEN" TO REPLACE MADISON SQUARE GARDEN.

A NEW "Madison Square Garden" will be erected in Times Square, occupying the block on Broadway between 47th and 48th streets, and extending back to within a hundred feet of Eighth avenue. The main



DETAIL BY WHEELER & STERN, ARCHITECTS.
The New Jersey Terra Cotta Company, Makers.

entrance to the Garden will be on Broadway with the remainder of the frontage occupied by stores. An office building six stories in height with a tower 200 feet high is planned for the 48th street corner. The 47th street side will have a theater on the ground floor, with a seating capacity of 1,100 and a stage 30 feet deep. Two other theaters and a covered winter garden will occupy the roof. The arena, which will seat about 20,000 persons, will be 250 feet long and 156 feet wide. Including the galleries it will furnish 160,000 square feet for exhibition purposes. On both sides will be tiers of seats, the ends being occupied by boxes. Underneath the arena will be another one of exactly the same size, available for show purposes but designed primarily for storage. A large rathskeller will be built in the basement and a café on the main floor. The plans have been prepared by Walker & Gillette and will cost approximately $1,500,000.



DETAIL BY TOLEDANO & WOGAN, ARCHITECTS.
Executed by The Northwestern Terra Cotta Company.

SUMMER HOME FOR OUR PRESIDENTS.

THE proposed home for the Nation's Capitol is on Mount Falcon, fifteen miles from Denver, Colorado, in the front range of the Rockies. All the details of the plan have been perfected and ground has been broken for this castle of gray granite. The design of the building calls for a picturesque style wholly in keeping with the natural scenery. James B. Benedict, architect, has prepared the plans.

BUILDING OPERATIONS FOR OCTOBER.

FORTY-FOUR representative building centers throughout the country, as officially reported to and compiled by *The American Contractor*, New York, show an aggregate loss of eight per cent for the month of October, as compared with the same month of 1910. The past ten months of the present year show a decline of five per cent, as compared with the same months of the past year. Gains of over twenty-five per cent for October were made at: Buffalo, 49 per cent; Chattanooga, 88; Dallas, 61; Grand Rapids, 113; Hartford, 35; Manchester, 68; Memphis, 27; Milwaukee, 36; Pittsburg, 111; St. Louis, 36; Scranton, 58; Toledo, 26; Worcester, 81.

NEW BRITISH MUSEUM WING.

THE exterior of the supplementary buildings to the British Museum, which are to be known as the King Edward VII. Galleries, has been completed, and presents a magnificent front at the approach from Torrington Square. The interior finishings and decorations will require another year to execute. At each end of the façade rises a tower, 90 feet high, ornamented with statuary. The new thoroughfare on which the galleries are located is to be known as British Museum avenue. The land and buildings cost $2,000,000.

HOTEL DIEU AT LYONS, FRANCE.

THIS charming old building will soon be demolished and in its place will be erected a large general hospital.

The new institution will accommodate some fifteen hundred patients and cover a site of forty acres. It will form a part of the university located in that city.

ACCORDING to the report of the State superintendent of public instruction, in the five years ended with June 30, 1911, the valuation of school property in Kansas increased an even one hundred per cent or from

DETAIL FOR MANUAL TRAINING SCHOOL.
Executed by South Amboy Terra Cotta Company.
E. F. Guilbert, Architect.

$5,000,000 to $10,000,000. During this period two hundred and thirty high schools have been established with six hundred additional teachers. The growing demand for agricultural knowledge is shown by the fact that practically all rural schools offer elementary instruction, and a practical course is offered in ninety-six high schools.

THE RAILWAY Y. M. C. A. BUILDING, RICHMOND, VA.
Faced with brick made by the Ironclay Brick Company.
Wilson, Harris & Richards, Architects.

THE fire losses in the United States during the year 1910, according to the National Board of Fire Underwriters, was $214,003,300. In addition to the enormous destruction of property hundreds of lives were sacrificed. In America the per capita loss is $2.51 while that in the cities of the six leading European countries amounts to 33 cents. This is attributable to the difference in the responsibility of the inhabitants in the various countries; the difference in the construction of the buildings, and the laws governing materials and conditions together with their enforcement.

DETAIL BY GILLESPIE & CARREL, ARCHITECTS.
New York Architectural Terra Cotta Company, Makers.

THE grand jury at the international art exposition, Rome, has awarded the grand prizes for the best sculpture work. Considerable regret is felt that the American artists were excluded from the competition because of the closing of the American pavilion by the American Commissioner before the final award had been made. It is conceded that if the American works had been judged John Singer Sargent would have received a grand prize.

AT THE invitation of the architectural school of Harvard University and the Massachusetts Institute of Technology, H. P. Berlage, the Amsterdam architect, will lecture this coming winter on "The Foundation and Development of Architecture." The ability and sincerity of Mr. Berlage has already won for him wide recognition in Germany, Austria, and Switzerland, as well as in his own country.

DETAIL FOR POST OFFICE.
Executed by Conkling-Armstrong Terra Cotta Company.
J. Knox Taylor, Architect.

ON THE site of the log cabin at Hodgenville, Ky., in which Abraham Lincoln was born, an imposing granite building—a memorial to the war President—was dedicated November 9th and accepted for the Nation by President Taft.

IN GENERAL.

Herbert G. Jory has opened an office for the practice of architecture in the Munsey Bldg., Baltimore, Md. Manufacturers' samples and catalogues solicited.

H. E. Weeks and F. R. Walker have formed a copartnership for the practice of architecture under the firm name Walker & Weeks, with offices at 1900 Euclid avenue, Cleveland, Ohio. Manufacturers' samples and catalogues solicited.

The architectural firm of Trunk & Heim, St. Joseph, Mo., has been dissolved. Benjamin W. Trunk and William Gordon have formed a copartnership under the firm name of Trunk & Gordon, with offices in the Donnell Court Bldg.

J. Earl Henry has recently been appointed architect and engineer for the Board of Education, Louisville, Ky., with offices in the Administration building. Manufacturers' samples and catalogues solicited.

The architectural firm of Walker & Hazzard has been dissolved. Hobart A. Walker will continue the practice of architecture at 437 Fifth avenue, New York City, and Elliott W. Hazzard will be associated with the firm of Hazzard, Erskine & Blagdon at the same address.

The Fred A. Jones Building Co.,

of Dallas and Houston, Texas, announces the opening of a permanent branch office at 1009-1011 Empire Building, Birmingham, Ala. Carroll Blake, formerly general superintendent for the company at Houston, will be the manager for the Birmingham branch, and Carl Symonds, who has been associated with Mr. Blake for the past ten years, will become the manager of the Houston office.

ANDREWS HOTEL, MINNEAPOLIS, MINN.
Faced with rose tinted tile made by the Twin City Brick Company.
H. L. Stevens & Company, Architects.

The facing tile used in the Andrews Hotel at Minneapolis, illustrated on this page, were 4 x 4 x 12¾ inches in size. The tile cost a little more than forty per cent less than a first quality of brick, and the saving in laying approximates nearly forty per cent more, depending somewhat upon the character of the building and the shade of tile selected for use.

The brick used in the house at Chestnut Hill, Pa., by Brockie & Hastings, architects, illustrated in the October issue of THE BRICKBUILDER, Plate 129, was furnished by Fiske & Co., Inc.

A meeting of the Gargoyles was held recently at the Hof-Brau House, New York City. At this gathering of young architects Professor Vining of Columbia University gave a talk on Business Psychology and Mr. Pierre Laird related his experiences abroad.

The Ohio Mining & Manufacturing Co., 96 Wall street, New York City, are looking for established parties to represent them in the following southern cities: Charleston, Memphis, Birmingham, New Orleans, and Houston.

The Columbus Brick & Terra Cotta Co. furnished the materials for: the Union Pacific Headquarters, Omaha, Neb., Jarvis Hunt, architect; the Southern Pacific Headquarters, Houston, Texas, Jarvis Hunt, architect; the Wheeler residence, Indianapolis, Ind., Price and McLanahan, architects; the Rike-Kumler Building, Dayton, Ohio, Schenk & Williams, architects; the Uihlein residence, Milwaukee, Wis.; the addition to the McCormick Building, Chicago, Ill., Holabird & Roche, architects; and the Otis Building, Chicago, Ill., Holabird & Roche, architects.

SCHWEITER BUILDING, WICHITA, KAN.
Built of gray Astrakhan Brick furnished by the Columbus Brick & Terra Cotta Co.
Richards, McCarty & Bulford, Architects.

Tables for Calculating Sizes of Steam Pipes for Low Pressure Heating, by Isaac Chaimovitsch, M. E., Price $2.00. Chicago: Domestic Engineering.

Three million dollars is being expended for the construction of a great market place at the foot of Thirty-Sixth and Thirty-Seventh streets, Brooklyn. The improvement will include the erection of one hundred and sixty-four buildings, a great market square, and two public piers, on one of which will be built a recreation shed. Other features will be a public bath, a fire engine, truck house, and a police station.

A twenty-story hotel will soon be erected at Dallas, Texas. The exterior will be treated in red velvet brick with stone trimmings and cost $1,000,000. Barnett, Hayes & Barnett of St. Louis are the architects.

Mr. William L. Bowman has removed his offices from 38 Park Row to 60 Wall street, New York City.

The building for the new School of Fine Arts, Pittsburg, has been erected in connection with the Carnegie Technical School. In the center of the edifice is a large atrium provided as a general concourse for the students. The top story is given over to painting studios, while the basement contains a large modeling room.

Madison Square, which in its day held some of New York's finest dwellings, is fast developing into a mecca of office and loft buildings.

DETAIL BY J. B. BENEDICT, ARCHITECT.
American Terra Cotta & Ceramic Co., Makers.

It was one of the élite sections of the city for many years. With its high stoop houses and big square windows, the place had a homelike appearance. Every house had its silver name plate, its silver knocker and its silver door knobs, resembling a square in London.

During the last few years, however, the old houses have been coming down in twos and threes, so that only a few remain of the many stately, handsome residences that surrounded the little patch of greensward ten or fifteen years ago.

Frank A. Bourne has been appointed to study Copley Square and other parks and squares in Boston with a view of protecting the city's interests in the arrangements for the new subway as well as facilitating the traffic and improving them in an artistic manner.

On the first Monday in May, June, July, and August, 1912, four county seat towns in southwest Kansas will be moved to other locations on the new Santa Fé line. Santa Fé, New Ulysses, Hugoton, and Richfield will change locations, the distances varying from six to twenty-five miles.

TREASURY DEPARTMENT, Office of the Supervising Architect, Washington, D. C., November 2, 1911.

SEALED PROPOSALS will be received at this office until 3 o'clock P.M. on the 14th day of December, 1911, and then opened for the reconstruction, etc. (including plumbing), of the U. S. Marine Hospital, at Stapleton, Staten Island, New York. The work consists of the construction of two three-story wings having a total ground area of 1,150 square feet, reconstructing the entire interior of the old building and adding a fourth story to a portion thereof. Drawings and specifications may be obtained from the Custodian of the building, or at this office at the discretion of the Supervising Architect.

JAMES KNOX TAYLOR, *Supervising Architect.*

The architectural firm of Kennerly & Iredell, St. Louis, Mo., has dissolved partnership. Mr. Kennerly will continue the practice of architecture at St. Louis, and Mr. Iredell will open an office at 722 Congress avenue, Austin, Texas. Manufacturers' samples and catalogues solicited.

The mural decorations in the Boston Public Library will soon be enriched by another of the Sargent decorations, the first of which was completed some time ago. Mr. Sargent is at present working on the scheme for the long side of his room, the subject being the "Sermon on the Mount."

THE BRICKBUILDER'S ANNUAL ARCHITECTURAL TERRA COTTA COMPETITION.

Problem: A Store and Loft Building from Four to Six Stories High.

FIRST PRIZE, $500. SECOND PRIZE, $250. THIRD PRIZE, $150.
FOURTH PRIZE, $100. HONORABLE MENTIONS.

COMPETITION CLOSES AT 5 P. M., MONDAY, JANUARY 8, 1912.

PROGRAM.

THE problem is a COMBINATION STORE AND LOFT BUILDING FROM FOUR TO SIX STORIES HIGH. The site is assumed to be in the middle of a city block located in the shopping district. The land is level and has 50 feet frontage and is 100 feet deep. The building is to cover the entire lot on first floor only, with suitable provision for natural lighting of rear portion of this floor. The lighting of other floors is left to the designer. The basement, first and second floors are to be occupied by a concern doing a retail business. Since the character of the business may influence the design it is suggested that the store portion of the building be treated either for the sale of pianos, jewelry, millinery, men's furnishings, boots and shoes, furs, sporting goods, or some similar line of business. The plans above the second story are to be of the loft type.

The exterior of the building is to be designed entirely in architectural terra cotta, and it is suggested that at least portions of the walls be treated in color. It is further suggested that provision be made in the design for the placing of signs.

The object of this competition is to encourage a study of the use of architectural terra cotta in this particular type of building. There is no limit set on the cost, but the design must be suitable for the character of the building and for the material in which it is to be executed.

The following points will be considered in judging the designs: —

A — The general excellence of the design, its adaptability to the prescribed material and character of the building under consideration.

B — The excellence of the first-story plan which, in addition to an attractive frontal treatment, must provide an entrance to a hallway in which will be located an elevator and staircase.

DRAWING REQUIRED. (There is to be but one.)

On a sheet of unmounted white paper measuring exactly 35 inches by 26 inches, with strong border lines drawn one inch from edges, giving a space inside the border lines of 33 inches by 24 inches, show:

The front elevation drawn at a scale of four feet to the inch.

The first-floor plan and a typical loft plan drawn at a scale of 16 feet to the inch.

A sufficient number of exterior details drawn at a scale of one-half inch to the foot to completely fill the remainder of the sheet.

The details should indicate in a general way the jointing of the terra cotta and the sizes of the blocks.

The color scheme is to be indicated either by a key or a series of notes printed on the sheet.

All drawings are to be in black ink without wash or color, except that the walls on the plans and in the sections may be blacked-in or cross-hatched.

Graphic scales are to be shown.

Each drawing is to be signed by a nom de plume, or device, and accompanying same is to be a sealed envelope with the nom de plume on the exterior and containing the true name and address of the contestant.

The drawing is to be delivered flat, or rolled (packaged so as to prevent creasing or crushing) at the office of THE BRICKBUILDER, 85 Water street, Boston, Mass., charges prepaid, on or before January 8, 1912.

Drawings submitted in this competition must be at the owners' risk from the time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The prize drawings are to become the property of THE BRICKBUILDER, and the right is reserved to publish or exhibit any or all of the others. Those who wish their drawings returned may have them by enclosing in the sealed envelopes containing their names, ten cents in stamps.

The designs will be judged by three or five well-known members of the architectural profession.

For the design placed first in this competition there will be given a prize of $500.
For the design placed second a prize of $250.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

The manufacturers of architectural terra cotta are patrons of this competition.

The competition is open to every one.

THE BRICKBUILDER

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LETTERPRESS

TOWER OF THE CHURCH
LA SANTISIMO, MEXICO CITY.

THE BRICKBUILDER

DECEMBER, 1911

VOLUME XX. NUMBER 12.

Forty-fifth Annual Convention of the American Institute of Architects.

AFTER a convention last year held on the Pacific Coast, the Institute of Architects returned again to Washington for its Forty-Fifth Annual Convention, held on December 12th, 13th, and 14th. While the convention was not marked by any new spectacular legislation on the part of the Institute, it was one marked by conspicuous unanimity of opinion on all the essential points of the various matters to which the Institute has given its attention for the last few years. The first morning session, on Tuesday, December 12th, was largely taken up by the registering of delegates, an address of welcome by General John A. Johnson, Commissioner of the District of Columbia, the address of the president, Mr. Irving K. Pond, and the appointment of the special committees who would have charge of the general work of the convention. Following this the reports of the Board of Directors, the treasurer, and the various standing committees were taken up, as well as the special committees, and these carried the convention over into its afternoon session, after which, as is usual in afternoon sessions, there were two interesting papers read. The real work of the session began on Wednesday morning, following the reports of the committees appointed to consider the various reports of officers and standing committees. This work again carried over into the afternoon session and was followed by a paper and then by general discussion on the subject of architectural education. In the evening occurred the interesting ceremony of the presentation of the gold medal of the Institute to Mr. George B. Post, in the National Museum. The remaining business and papers were largely confined to the morning session on Thursday, the announcement by the tellers of the election of officers for the coming year being put over to the afternoon session, which closed at an early hour with a few brief words by Mr. Walter Cook, the newly-elected president. The other officers elected were as follows: First Vice-President, R. Clipston Sturgis; Second Vice-President, Frank C. Baldwin; Secretary and Treasurer, Glenn Brown; Directors, I. K. Pond, John M. Donaldson, and Edward A. Crane; Auditor, T. J. D. Fuller.

The report of the retiring president, Mr. Pond, hinted briefly at the work accomplished and the progress made during the past year, and called for the unselfish support by the members of the Institute of all the vital matters which the Institute has at heart, the firm development of which means so much to the whole profession in the United States. The same attitude was echoed in the report of the Board of Directors with special reference to the great question of competitions, to which the recent committees have given such conscientious labor and the profession serious consideration.

The treasurer reported a most encouraging condition of the reserve fund and the general treasury.

The labors of the Standing Committee on contracts and specifications have reached fruition in the shape of a first standard edition, arrangement for the publication of which has been made with E. G. Soltmann in New York, who has for some years been the publisher of the Uniform Contract. These documents may well meet with complete adoption by many architects. In any case they cannot fail to be of very real value as standard forms by which an architect may measure up his own documents, which he has developed along personal lines and which he does not therefore wish to abandon, but which may well profit by comparison with standard documents such as the committee has put forth.

The Committee on Education has for the past year been particularly concerned with the development of the various lines of education open to draftsmen in addition to the regular courses in architecture at the universities.

From the committee's report it was very evident that it considered that too great specialization, by the comparatively young draftsman, in the matter of design is a very dangerous factor, and it urged everywhere the coordinating of courses in design with other courses in allied subjects, such as mathematics, construction, and history, in order to give the beginner in the profession some idea of the breadth of training necessary for one who expects at some time to be an architect in independent practice.

Mention may best be made here of the most admirable paper read by Mr. Lloyd Warren on Phases of Architec-

tural Education, in which he made a most eloquent plea for a broader development of the æsthetic perceptions of students of architecture through training in the allied arts of painting and sculpture. His remarks were greeted with no little enthusiasm by the convention, and it was immediately voted that his paper be printed by the Institute for general circulation.

The question of competitions was perhaps the one which brought forth the keenest general interest. The report of the Committee on Competitions reviewed briefly the various competitions which had been brought to its attention during the year, and it was of great interest to note the widespread acceptance of the code by owners, and also the evident desire upon the part of the members of the Institute to abide strictly by these terms. There were, of course, instances cited where competitions were frankly carried on at variance with the general rules laid down by the Institute, due either to a lack of understanding on the part of the owner or to legal difficulties, or in some cases to a definite refusal to modify personal desires to conform to an order of procedure which the Institute lays down for its own members, simply as one which in its opinion is best calculated to produce the best results both for the owner and for the architect. The fundamental point in the vote of the Institute two years ago in the matter of competitions was that it should be considered unprofessional conduct for a member of the Institute to take part in any competition *which had not been previously approved by the Standing Committee on Competitions.* The question as to whether the program for a competition conforms to the various rules of the Institute code concerns merely the committee and its various local subcommittees. The only question which a member of the Institute has to consider is whether the committee has definitely approved the program. That the ascertaining of this one fact is all that concerns the prospective competitor will be much more generally understood after the open discussion in the convention. A suggestion that the whole code be made merely advisory in nature, thus removing the mandatory character of certain provisions and destroying the fundamental strength of the code as now in operation, was overwhelmingly defeated. The fact of most general significance is that the evidence of the Committee on Competitions shows that the general public is rapidly coming to the conclusion that the rules laid down for the governing of the actions of members of the Institute in the matter of competitions are rules which should also govern the owner in the conducting of competitions if he is desirous of obtaining the most satisfactory result.

Perhaps the one other most important business of the convention was the authorization of the appointment by the Directors of a Committee on Public Information. For several years the Philadelphia chapter has had such a committee, and during the past year similar committees have been established in other chapters. Without question much can be done by a properly organized and active committee of this sort, through the distribution to individuals and publications of all matters of interest occurring at meetings of the various bodies of architects. In this way, for instance, the principles of the Institute code on competitions can be clearly set forth for the enlightenment of all architects, whether members of the Institute or not, and of the general public. It should not be a difficult task also to complete the work, already started by the existing local committees, of creating a custom of giving proper acknowledgment of the architect when illustrations of recent work are published in the daily press. Seldom is a painting referred to in a newspaper to-day without due reference to the name of the painter; similarly with a work of sculpture. There surely can be no reason, other than a careless lack of appreciation, to excuse the very frequent publication of a building with no reference whatever to the architect, who not only designed the work but on whom rests the large business responsibility of carrying the execution of the work to a successful conclusion. The profession may well look for beneficial results from the establishment of this committee.

The Committee on Conservation of Natural Resources laid particular stress in its report this year upon the efforts which should be made to preserve the banks of the Potomac in the near vicinity of Washington by the formation of a national park, and the general commendation by the convention of such a scheme was expressed.

Mr. Totten, of Washington, made report of the last International Congress of Architects, held in Rome, and the convention voted to urge the holding of the Congress in 1917 in Washington, and urged the sending of a complete set of photographs of American architecture to the convention to be held in St. Petersburgh in 1916.

Stress was laid upon the need of attention to systematic development of city and town planning, and it was urged by the convention that the work of this committee be so developed, if possible, as to bring the approval of the Institute, through its Board of Directors, directly to the attention of such bodies as are considering the development of districts through properly organized and adequately financed commissions.

A paper was read on the advantages of licensing of architects, by Mr. H. B. Wheelock, of Chicago.

Mr. J. Milton Dyer read a paper on the effect of competitions on design, showing that the government competitions under the Tarsney Act have helped largely in creating a government architecture at the present day vastly better than that which obtained before.

A most interesting talk on recent developments in paint technology was given by Mr. H. A. Gardner, Assistant Director of the Institute of Industrial Research.

The Octagon has been enriched by the gift, from the San Francisco Chapter, of the table on which President Madison signed the treaty of Ghent. He was at that time occupying the Octagon as his official residence, the White House having been burned down by the British.

The convention was brought to a close as usual by a banquet, on Thursday evening, at which the principal speakers were Senator Chamberlain of Oregon, Senator Hitchcock of Nebraska, Representative Slaydon of Texas, and Representative Kent of California. It was apparent from their remarks that the commission's plan for Washington, especially its site for a Lincoln Memorial, is not without its ardent supporters in Congress; but that the architects themselves should do their part in the forming of public opinion, and the bringing of that opinion to the attention of the members of Congress.

How Architects Work.

D. EVERETT WAID.

I. — OFFICES OF NOTED ARCHITECTS.

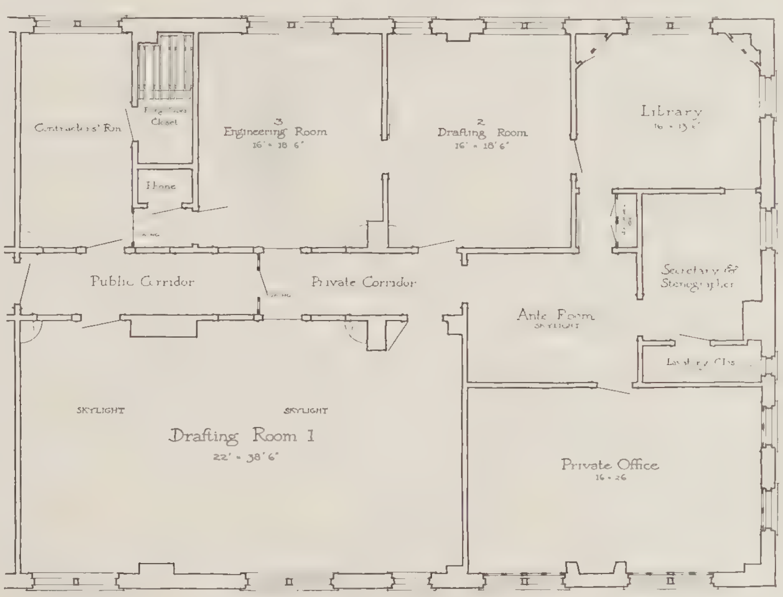
A STUDY of what architects do, where they do it, and the means they use, — is intended to be briefly compassed under the title, "How Architects Work."

As an introduction, it may be interesting to many to catch a glimpse by means of plans and photographs of the interiors of the workshops of some of the well-known members of the profession. Each observer will detect for himself the extent to which each workshop shows a tendency as between an artist's studio and a cold business office; as between a dominant serene and well-lighted drafting room and an engineer's vibrant executive headquarters. Each imaginative visitor may speculate for himself as to the influence on the plan of each office due to the personal qualities and taste of each architect, or the volume of his work, or the class of work, if he specializes, or all those factors.

An architect's office in its beginning is a single room with one lone draftsman to give it a name. As soon as he scents a job and material dealers get wind of it and call too numerously, he curtains off an entry and gets a boy to close the door. The drafting room is still the consultation room for the client, and letters and plans and specifications are concocted on the same drawing board. In good time the entry grows to be divided into a business office for stenographer, letter files, and contractors; and the drafting room swells remarkably and suffers successive protoplasmic separations of private office, consultation room, library, specification room, engineer's room, superintendent's room, drawing file room, testing laboratory, photographic room, sample room, etc.

Let us imagine that our first visit to such a development of a real architectural shop is a call upon a great designer of hotels. He is located in a plain office building, and inasmuch as his reception room is nothing more than a piece of the plain public corridor of the building, we are disappointed, and, in fact, are not quite sure that we have arrived. The open door at the left, however (marked on plan "Contractor's Room"), discloses a wide-awake office boy sorting blue-prints to issue to bidders or to file in the very small filing closet, and he takes our card and disappears. Very quickly he returns to conduct us through the "Anteroom" (where first we perceive that we have entered an architect's domain) to the "Private Office." There alone, in a quiet spot, — so silent that not even the hum of New York streets or the distant rumble of elevated trains can be heard, is Mr. Hardenbergh quietly writing specifications. The roll-top desk is made to fit its place and the beautiful Florentine chair revolves as comfortably as the ugliest business chair could possibly do. As we are

OFFICES OF H. J. HARDENBERGH, 47 W. 34TH STREET, NEW YORK CITY.



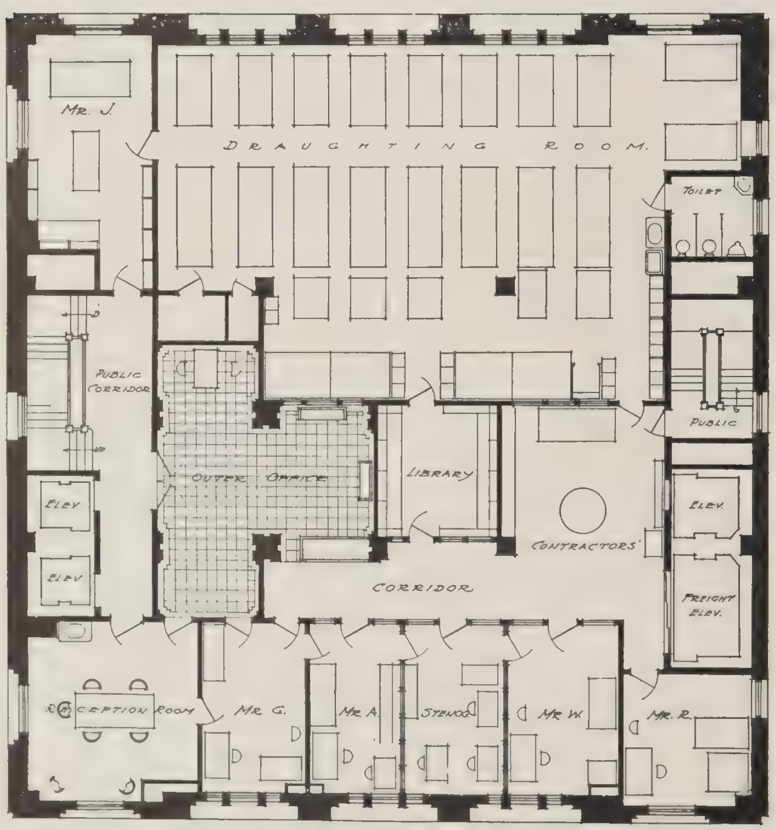
greeted courteously by this gentle host, and the conversation turns to the table, the mantel, the rug, even the interesting fixtures which he has designed to light the mural paintings, and note the soft color harmony illumined by six plain leaded glass windows, which, at the same time, shut out unpleasant neighbors, we feel that the individuality of the architect must be impressed upon the client who comes here. This is not a domestic room, a room in a palace, nor an office. It is the studio of an architect. The library near at hand is not different from others. Aside from its treasures of books, there is a conference table in the middle of the room and under one window an engraving case, such as one sees in print shops, in which are kept for easy reference some of the fine interior scale drawings which should not be ruined and lost among files of blue-prints. We pass through the suite of simply furnished rooms, note the two drafting rooms with boards all neatly protected with cloth covers (it is Saturday noon and the draftsmen have gone home), and the engineering and specification rooms. Before we end our call we have seen the floor plan of a Titanic new hotel with its admirable scheme of circulation, and then Mr. Hardenbergh refers to that nuisance of an architect's office, the filing of drawings, expresses the preference for flat filing instead of rolls, and mentions as hope deferred the famous file room of Carrère & Hastings.

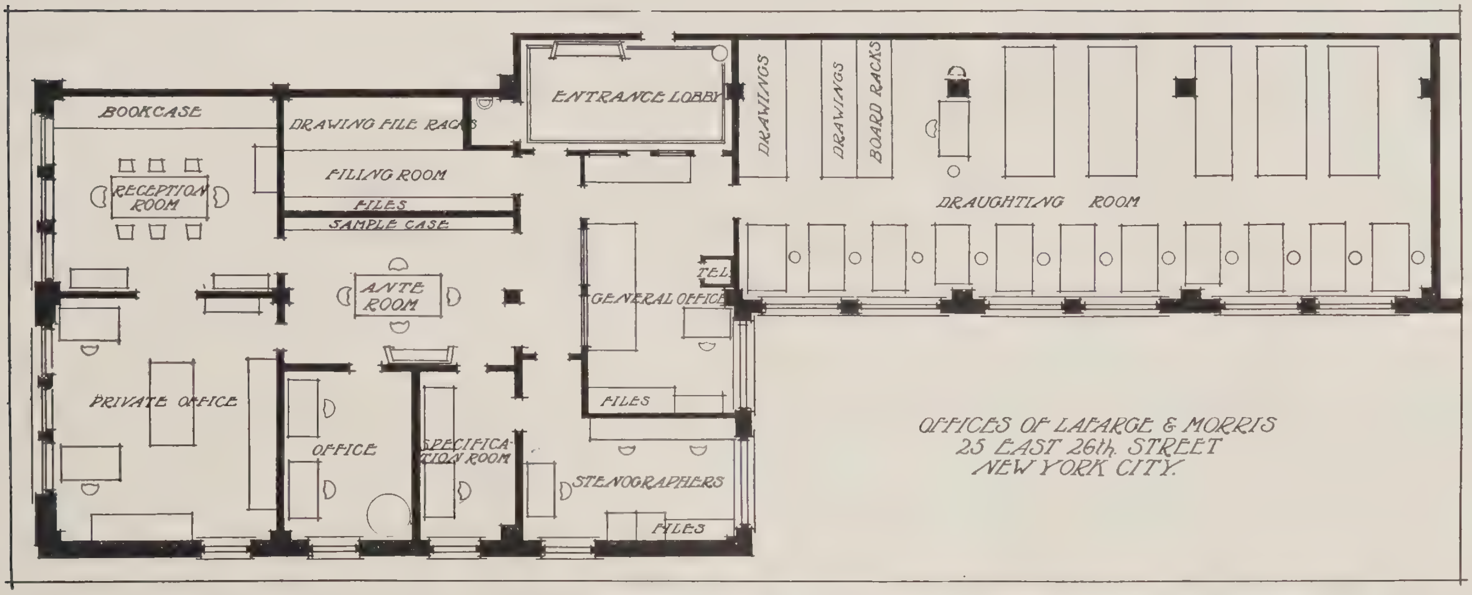
Next we turn our steps to 24th street and enter the T planned outer office of Mr. Cass Gilbert. Here our first impression is unmistakable; we are in an architect's office. Sculpture and rendered drawings of magnificent buildings hold us enthralled while we try to propitiate the guardian who issues blue-prints over the counter at one side. Beyond the "Outer Office" everything seems business-like as we pass through the rooms of "Mr. G.," "Mr. A.," the secretary, and into the executive offices of "Mr W." and "Mr. R." Bidders probably take drawings to their own offices and never see the "Contractor's" room, which is in reality a sample room. The walls are lined with "unit" bookcases whose glass fronts save the necessity of dusting innumerable pieces of hardware, bricks, and marble. This is also the mailing and general utility room. The wealth of the library is easily accessible from either the drafting room or the executive offices. When we enter the drafting room we get a vista of endless drawing boards. Roll-top desks are located on opposite sides of the column, one for the mechanical engineer and one for the specification writer. Immense steel cases stand against the side wall, with drawers six feet long or more, topped with box files of drawings of completed buildings. Each draftsman has a wire wardrobe locker placed as indicated. The room designated on plan "Mr. J." is a small drafting

OUTER OFFICE.

DRAFTING ROOM.

OFFICES OF CASS GILBERT, 11 EAST 24TH STREET, NEW YORK CITY.





room, a desirable feature in every large office. Business is in progress, a conference is on in the reception room, so we must call again to see that handsome sanctum which opens from Mr. Gilbert's private office and commands a fine view of Madison Square.

Many of the New York architects are to be found around Madison Square. We shall wish to call upon three, all in one building at the north end near Madison Square Garden and the Society for Prevention of Cruelty to Animals. The first of these is the firm who designed the Lion House, the Reptile House, and others in Bronx Park, where is to be found the finest Zoo, not even excepting that at Amsterdam. Heins & La Farge, now La Farge & Morris, have a long narrow drafting room with eastern light. The reception room and library looks out on the Park through south windows. It is simply furnished, but has a reversible table worth going a mile to see. An attractive decorative effect is given by the books, a piece of tapestry, a large example of Japanese carving, and a fine perspective of the Cathedral of St. John the Divine. One passes from the "Anteroom" or from the "Reception Room," into the "Private Office," where both members of the firm have their desks. The very plain "Entrance Lobby" which one sees first on entering this office is floored with richly colored tiles. Opening a glass screen door, the visitor then finds himself in a spacious "Anteroom" with a floor which is a testing out of an almost white composition. The plan suggests clearly the arrangement and furnishing of the convenient and well-lighted office of La Farge & Morris.

VIEW OF DRAFTING ROOM AND PLAN. OFFICES OF MAYNICKE & FRANKE

25 MADISON SQUARE NORTH, NEW YORK CITY

If we take elevators to the roof of this same twelve-story building, which was designed by our next victims, Maynicke & Franke, we shall see an example, an exceptional one, of a New York "pent house." Since they

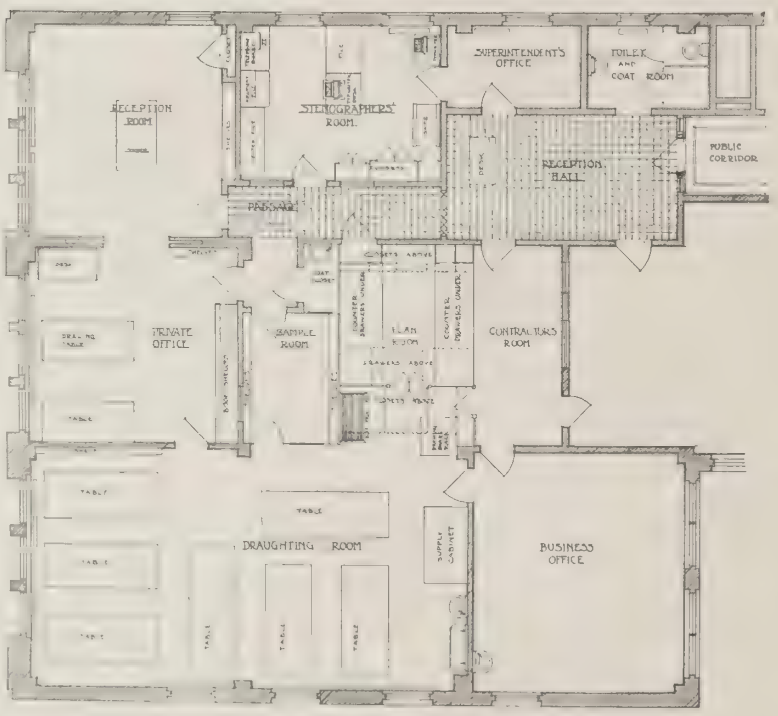
have all there is of a thirteenth story, we land from the elevators in, not a public corridor, but their own private hall, which is simply decorated with enough perspectives to impress the visitor that he is in an architect's office. The "Hall" is part of the generous "General Office," which is made impressive with an immense color representation of St. Mark's at Venice, hung opposite the fireplace. Before one can reach the hotel-like counter, his approach is detected by the telephone lady and he can quickly learn whether he may see one of the firm. flooding the room with draftmen's soft northern daylight, which combine to make an exceptionally spacious and well-ventilated and lighted workroom — another worthy architectural studio.

Turning our attention now to a third office in this same building, we call upon Donn Barber. We enter the "Reception Hall," which is treated in tones harmonizing with light oak. It breathes a gentle, refined welcome and makes us know at once that a designer's atelier is somewhere near. There is, however, at the guardian's

DRAFTING ROOM.

PRIVATE OFFICE.

OFFICES OF DONN BARBER, 25 EAST 26TH STREET, NEW YORK CITY.



On this occasion, we are ushered into Mr. Franke's room, which has a floor of cork tiles, and walls covered with very white oak wainscot and bookcases. The table covered with rare books, the flat-top desk, and the chairs, are dark mahogany. When we visit Mr. Maynicke's room, we may discover that both partners are expert amateur photographers and can show us some of the marvels of color photography and a model dark room in which they are developed. A new exclamation of surprise is elicited when we go into the drafting room. Here is the Grand Central Terminal of drafting rooms. This pent house, not hampered with a low roof, has a lofty vaulted ceiling and four great bays of windows

desk in front of us a smiling, polite, young major domo, who knows that Mr. Barber is out at the present juncture, and who is sure moreover that we could not possibly be interested in an office without Mr. Barber in it. He is quite right, for we believe that the plan tells quite a bit about Mr. Barber. Note how he placed the business end of the office, touching the drafting room at one end, and the reception room at the other, and how the primary designing board is hedged on both sides. The interesting arrangement of the office and relation of its parts are evident on plan. Perhaps we may have some details to consider in a subsequent issue.

THE ARCHITECT'S LIBRARY: J. H. Sellars, in discussing "The Architect's Use of a Library," says that it is doubtful if the old architects understood the history of art as we do to-day. Knowledge of history obtained through our books and photographs impresses upon us the fact that great styles are based on reason and logical construction, and that buildings to be considered great must fulfil their purpose. Wide reading will aid us in the formation of an artistic character and a power of æsthetic reasoning.

Commemorative Monuments.—I.

H. VAN BUREN MAGONIGLE.

ONE of the most admirable impulses of men is that which moves them to the erection of memorials that shall be visible reminders through the years of the great dead who played their parts well in the theater of human affairs.

A certain pathos attaches to monuments to men who were not appreciated in their lifetime or were contemned or actually vilified; but to the living, struggling against adversity or prejudice perhaps, they should be at once an inspiration and a consolation; for Time is the only touchstone by which the ultimate value of any effort may be tested; the final verdict rests with posterity — and if the work be well done, if the idea is one worthy of what in our finite way we call Immortality, if a man has made a real contribution to the sum of human progress, he may be sure that sooner or later the world that follows him, and finds the spark he kindled still alight because of the life in it, will honor him according to his desert. Of all the workers, of all the leaders in thought and action, only a few will be selected by the forces of time and opinion for honor by visible memorials. For the vast majority the work itself must be the sign of their passing; and this is especially true of architects and other artists; memorials to them are rare; but in every work that leaves their hands, by loving thought and care, by devotion to duty, and to beauty as it is given them to see it, they may build their own monument and write their own epitaph in terms more true and trustworthy than the words of the epigraphist; no one can doubt the innermost character of a Bramante as revealed by his work; we feel that we are in the presence of a gentleman with a gentleman's restraint and refinement; that his mind was subtle, his sense of beauty sure and true. One need not read Cellini's autobiography to know his traits — the dash, the freedom, the contempt of convention amounting to lawlessness — these are in his works.

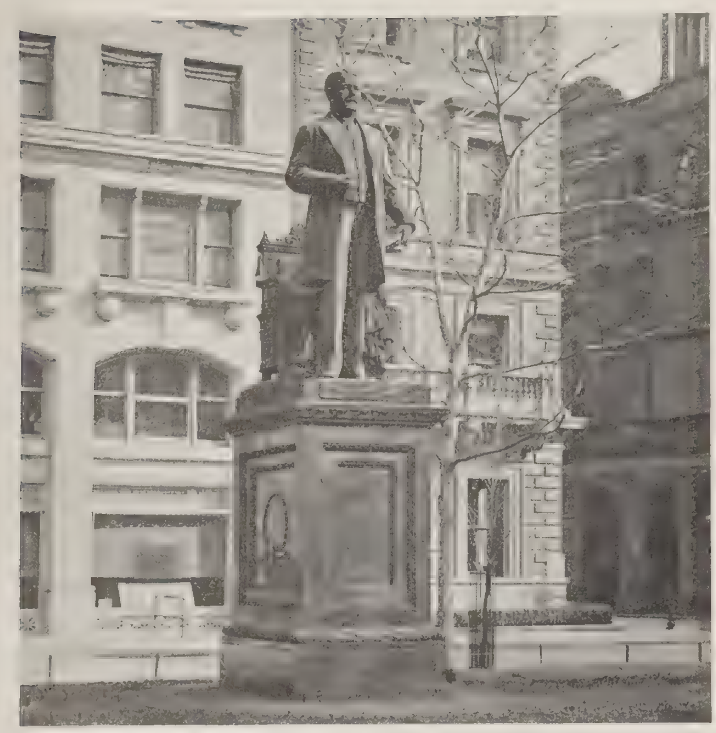
LION OF LUCERNE, LUCERNE, SWITZERLAND.

It is only in modern times, however, that monuments have arisen by reason of the desire of the people to honor their great men. In earlier days men erected memorials to themselves or to their gods; the narrow ways of Grecian Olympia were crowded with statues of victors in the games, paid for, with exquisite modesty, by themselves; the despot, king or emperor, decreed his own monument and superintended its erection, having no faith in the judgments of posterity. These have no significance for us except as marking the monstrous and pathetic egotism that Shelley has laid bare in

OZYMANDIAS OF EGYPT

I met a traveler from an antique land
Who said : Two vast and trunkless legs of stone
Stand in the desert. Near them on the sand,
Half sunk, a shattered visage lies, whose frown
And wrinkled lip and sneer of cold command
Tell that its sculptor well those passions read
Which yet survive, stamp'd on these lifeless things,
The hand that mock'd them and the heart that fed ;
And on the pedestal these words appear :
'My name is Ozymandias, King of Kings !
Look on my works, ye Mighty, and despair !'
Nothing beside remains. Round the decay
Of that colossal wreck, boundless and bare,
The lone and level sands stretch far away.

The statues, arches and columns of the Roman emperors may be considered as manifestations of a similar spirit; the Cæsar did not wait for a venial senate and a servile populace to come forward, but attended to the matter himself. In Gothic times men's eyes were fixed upon another world and we find but monuments to God, to the Virgin and to the saints; save those sepulchral monuments which also show their preoccupation with thoughts of death and a life beyond the grave. In all ages, to be sure, the tomb or funeral monument received a large measure of thought and care; ancient cities had their streets of tombs, stretching away from the city gates, crowded on either hand with cenotaphs of every form; and from the Mausoleum of Halicarnassus down to the humblest stele that affection had raised over some beloved clay, the last resting place of king or helot has been the object of tender commemoration. In the Helen of Euripides occurs this invocation: "All hail! My father's tomb! I buried thee, Proteus, at the place where men pass in and out, that I might often greet thee; and so, even as I go out and in, I, thy son Theoclymenos, call upon thee, father!" But these were marks of personal or family affection, vestiges of the ancient propitiatory worship of the ghosts of the departed, as others we have noted were the products of personal vanity; and it is not until the Renaissance that the modern spirit is made manifest; then, men nurtured in the Christian faith but made



STATUE OF CHESTER ALAN ARTHUR, NEW YORK CITY.

mentally free by a new contact with the antique world of thought and art began to build monuments to others than themselves or their immediate family and friends, out of a real desire to do them honor.

There is another class of monuments that must be noted — those which signalize an event or an idea or abstraction, and in which the individual has no part or a very subordinate one. These present a still greater ethical advance — the "Triumph of the Republic," the "Peace Monument," the "Dying Lion of Lucerne"; at the École des Beaux Arts one of the problems given was a monument "To all the Glories of France." In such monuments the mind is entirely divorced from the personal and is centered upon a pure abstraction.

Allied to these are memorial fountains which may be so conceived as to appeal to us by their beauty or interest, and the great part they may bear in the general monumental aspect of a city.

It is not proposed here to treat of monuments as isolated facts either from their human side or as mere masses of stone and bronze; they are to be discussed as forms in which men have sought to embody their sense of reverence for the great man or act or idea; in reference to their merits or demerits as works of art; but also we are to consider them on broader lines as elements that may under proper conditions contribute to the beauty of a city; without monumental conditions we fail of truly monumental effect; in Europe we find these conditions in far greater measure than here; and especially in France the treatment of the site, approach, and *entourage* are given careful consideration. Upon the harmonious interrelations of these depend much of the effect of the monument upon us whether we are actively conscious of it or not.

To be properly successful, a monument must be designed for a definite spot, and designed in reference to that spot and to no other.

The designer must take many things into account — he must study the approach, the effect from a distance, the scale of the parts to the whole, and the scale of the whole in relation to that of the immediate surroundings.

If the monument is to be placed where it will have a building as a background, he must study the architecture of that building, and if this is broken and restless, the quieter and simpler his design the better. If the building is severe in character, he could permit himself a richer silhouette, and more action in the sculptural adjuncts, bearing constantly in mind, however, that harmony must result.

Again, if the composition is to be placed at the intersection of several streets or at any point where a distant view of it, outlined against the sky, is to be had, he must design the silhouette as it will appear against the sky, and having thus determined the form and the accent that will tell best at a distance, subordinate the details to this general effect.

The problem in a park is to be solved in an entirely different way, and yet in obedience to the general principle that the surroundings must determine the character of the design. In a park the question of the color of the monument plays an important part in its relation to that of the foliage. It is fairly questionable if a dark bronze statue, for example, is seen to the best advantage with trees as a background; its color and its shadows confuse themselves with those of the foliage, and the essential elements of clarity and repose are lost. In France white marble is a favorite material for park sculpture and tells best against the green. If bronze is to be used for the sculpture, it would seem reasonable to so design the composition that the bronze may be seen against a background of light stone, which in turn defines itself against the trees and shrubs.

It is to be borne in mind that a monument in any form,

STATUE OF NATHAN HALE, NEW YORK CITY.

whether it be a statue, a shaft or a fountain, is a formal thing — that it commemorates something — some man, some act, some word or idea, and to the poorest and least artistic is thereby imparted a certain dignity which demands a setting and approach of equal dignity.

It is moreover what we may term an artificial form, bounded by more or less rigid and conventional lines, and its immediate *entourage* must be so treated as to blend these lines imperceptibly into the lines of its surroundings, whatever these may be. This is a principle so obvious that it seems scarcely necessary to enunciate it, but to judge from the examples we have in our midst of a neglect or non-recognition of this principle, we might be led to believe that it does not exist.

VIEW FROM CUPOLA OF ST. PETER'S IN ROME, ITALY.

In a park or square with trees and shrubbery, it is imperative that just around our monument, at least, there should be an adequate formal treatment of the paths with perhaps a certain modeling of the ground and turf that will serve to unite the conventional architectural lines with those of that strange imitation of nature with which most of our landscape architects provide us.

I have in mind, among others, two particularly vicious examples of neglect of this basic principle in New York — one is the statue of President Arthur in Madison Square, which rises in sweet simplicity, sometimes out of a flower bed, sometimes out of the turf, as the fancy of the gardener dictates, in such a manner as to suggest irresistibly the conclusion that it also is a vegetable growth — the other is the statue of Nathan Hale, a really beautiful thing, in City Hall Park, and which is also placed without relation to anything whatever except the grass that grows around it.

In paved open spaces there are to be found, in the circumjacent buildings and sidewalks, lines that will help to support and repeat those of the monument — yet even here a tie, a more obvious relation is needed such as a fine pavement affords, designed in relation to the monument, as in the great square before St. Peter's in Rome; or in the court on the Capitoline hill around the statue of Marcus Aurelius.

So much for the treatment of the monument and its setting; the broader question — that of the absolute necessity for monumental conditions if the monument is to produce its proper effect — is the one I wish to emphasize, and that not only a harmonious setting but a proper approach are absolutely essential to dignity.

As things are at present, the designer of a monument is seriously handicapped. He designs his monument for a certain site, and as much as possible in harmony with what he finds about it. The monument is erected; the next day ground is broken close by for a twenty-story building, and his monument is killed.

STATUE OF MARCUS AURELIUS, ROME, ITALY.

The "sky scraper" thus creates a new condition, and will probably banish all monuments, other than low fountain basins and perhaps statues, to the parks where they will not be forced to compete with the mass of these enormous structures. The tall building has come to stay, is the outcome of legitimate conditions, and must therefore be reckoned with.

There is thus a distinct relation between the character of the city street or square and any monumental project. Let us take a street in Paris and assume that the vista is closed by an important monument. The buildings on each side have cornices of a uniform height, and horizontal divisions that coincide, and within these limits compositions that vary sufficiently for their individual interest. Calm, quiet, monotonous if you please, but the monument tells — it carries, and we find, when we analyze the effect

of the vista upon us, that this calm, that this quiet monotony is a foil, a preparation for the richer composition that fronts us at the head of the street — that the eye is unfatigued and can therefore appreciate.

Now let us assume for a moment that we have a street in New York leading up to an important monument (we haven't, but never mind); a typical street, with the buildings leaping to all sorts of heights on either hand, each more ornate than its neighbor, each making its own frantic appeal for notice. What would become of the monument? Would you care for it when you reached it? Would your eye feel rested and ready to examine it with interest? Wouldn't you feel as you would if you had dined entirely on cake — that pudding was superfluous?

WASHINGTON ARCH, NEW YORK CITY.

Mark the difference! Both are commercial streets; in both instances the buildings are commercial buildings and have no claim upon our special interest. But the monument has. It stands for something greater and finer than mere business, and should be led up to; the attention should not be distracted, but directed, and we should carry away with us a definite impression of the nobility and grandeur of the composition of which street and monument should be integral parts. It is the whole monumental effect of things that is of real importance. Monotony has its uses. Absolute monotony is as tiresome as constant variety, but it is the just relation and proportion of each that makes for the monumental.

PLACE DE LA BASTILE, PARIS, FRANCE.

In stating that we have no street in New York leading up to an important monument, I want to make an exception in favor of Fifth avenue and the Washington Arch, and the streets leading up to Columbus Circle and the column there. For this, the present plan of the city is responsible.

Let us compare the plan of the city of Washington with that of New York.

There we find radial avenues of magnificent width, starting from well defined and monumental centers, intersecting each other at minor centers where small parks are managed. These small parks, and other larger ones, lie on the axes of these avenues, so that any public embellishment placed there will have an axial approach in at least four and often more directions.

The minor streets are laid out on the gridiron plan so familiar to us, and where the diagonal avenues cut across them numerous triangular spaces are created.

With what result? A varied and rich perspective, a series of charming vistas accented or closed by some object of interest — a statue, a fountain, or a building.

Return to New York and we are struck at once with the fact that Broadway is the one diagonal street above the downtown district, and that the only points at which real architectural interest is possible are created by its intersections with the avenues.

Some of these triangular spaces along the line of Broadway are occupied more or less adequately by monuments; others are found in the badly planned parks and squares, where winding paths take you just where you don't want to go, in a silly, futile effort to produce a *rus in urbis;* and scarcely one satisfactory site can be found in them for any monumental purpose. I do not wish to be understood as insisting that parks and squares should be created for the purpose of putting monuments in them. But I do insist that it is silly to attempt to produce the effect of a pastoral landscape in the heart of a city in any space of the size of our principal squares, that a certain formality of treatment is imperative in a city square, and that then, when a monument is to be placed, a decent and dignified approach and setting may be found.

The Design of a Physical Laboratory.

ALBERT P. CARMAN.

THE design of a highly specialized building like a university physical laboratory presents many problems outside the experience of the general architect. The literature on the design of such buildings is very meager. A number of laboratories have been described in a general way, but often with particular emphasis on fittings and apparatus and with little, if any, discussion of the problems supposed to be solved in the design. The following article, it is hoped, will help fill this deficiency. The writer had the responsibility of making specifications for the design of a physical laboratory for the University of Illinois, and was in consultation with architects and superintendents during the erection and equipping of the building. It is believed that an explanation of the plans finally used will aid those who have to design this type of building.

About twenty leading physical laboratories in this country were visited, and the floor plans of practically all of the recent laboratories secured. Several months were spent in making floor plans after various schemes. In this preliminary work an architectural student was employed to make drawings to exact scale. The possibilities and advantages of various schemes were thus made manifest, and the essential principles to be followed in the design became evident. In these preliminary studies as well as later, Prof. J. M. White of the Department of Architecture and Prof. C. T. Knipp of the Department of Physics were active workers. This preliminary work was done before the election of the architect, there being a delay of several months in his election, and the result was that a very complete and definite list of conditions was furnished him. The architect found the general results of these preliminary studies very helpful, and nowhere asked for a sacrifice of technical requirements to get architectural effects.

LABORATORY OF PHYSICS, UNIVERSITY OF ILLINOIS, URBANA, ILL.
W. Carbys Zimmermann, Architect.

The character of the work in physics, which consists of the usual undergraduate courses, and of a considerable and growing amount of graduate work and of investigation, fixed the number and general character of the rooms desired. The site was also fixed, a rectangular space of about 250 feet square with a south front for the building. Fortunately or unfortunately, the University has adopted no style of architecture, so there was no question of adapting ecclesiastical windows or projecting buttresses or classical columns to the requirements of unrestricted light. Such architectural styles present very difficult problems in laboratory design. They have been solved more or less successfully, but the difficulty is such that we cannot wonder that more than one professor has suggested that the best style for a laboratory would be that of the common workshop, and perhaps with saw-tooth roof construction. But efficiency is not in conflict with dignified architecture, and a university physical laboratory should be an attractive building to conform to the importance of the science in university work. The exterior of a physical laboratory is important to the man of physics, principally in its allowing a convenient window spacing, with unobstructed light, as well as being inexpensive, so that no interior convenience need be sacrificed. The style chosen as appropriate to our surroundings fitted our requirements and money, and gave us a dignified and pleasing exterior without sacrificing interior plans. The elevation and the four plans discussed below are shown in the accompanying illustrations.

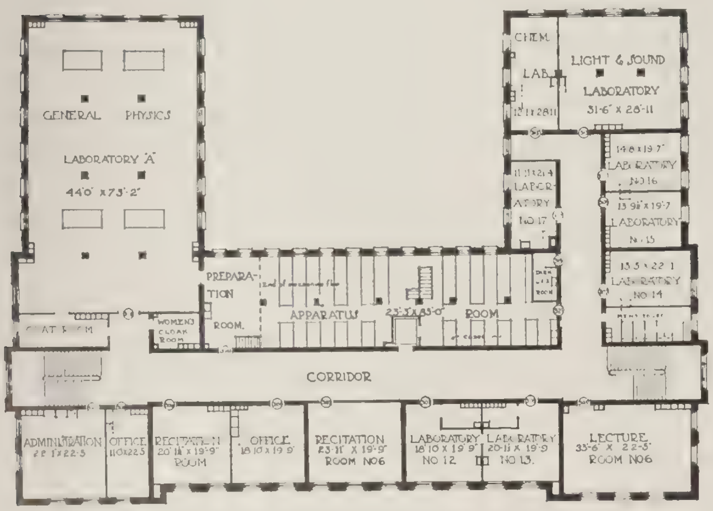
Freedom from mechanical disturbances is of such obvious importance for much of the work in physics that it received early consideration. Since the laboratory is for university instruction the location is necessarily central, and that means in the midst of various activities which may cause vibrations. The first thing decided was to use extra heavy masonry walls and as far as possible to carry the floors on masonry walls rather than on steel columns. This involves many cross walls which run the full height of the building and give a rigid cellular design as seen in the floor plans. Over three million bricks were used, probably twenty-five per cent more than would be used with steel columns in a building of this size.

Next came the effect of room arrangement and of equipment on stability. To avoid the disturbances caused by the movement of large classes of vigorous students the large laboratories and the class rooms are put on the west side of the building. Most of the students naturally use the west entrance, so that this design minimizes the travel across the building. The east side of the building is thus given over to the twenty-five smaller laboratories which are used by advanced students and individual investigators for the more delicate experiments. This side of the building is much heavier in construction owing to numbers of interior masonry walls.

An equally important question was the location of moving machines. The ventilating fans, the liquid air plant and department machine shop are placed in an annex building which has a foundation separate from that of the main building. A hydraulic plunger elevator was installed partly on account of its simplicity and safety, but mainly because it introduced no rotating machinery. All the rotating machinery in the main

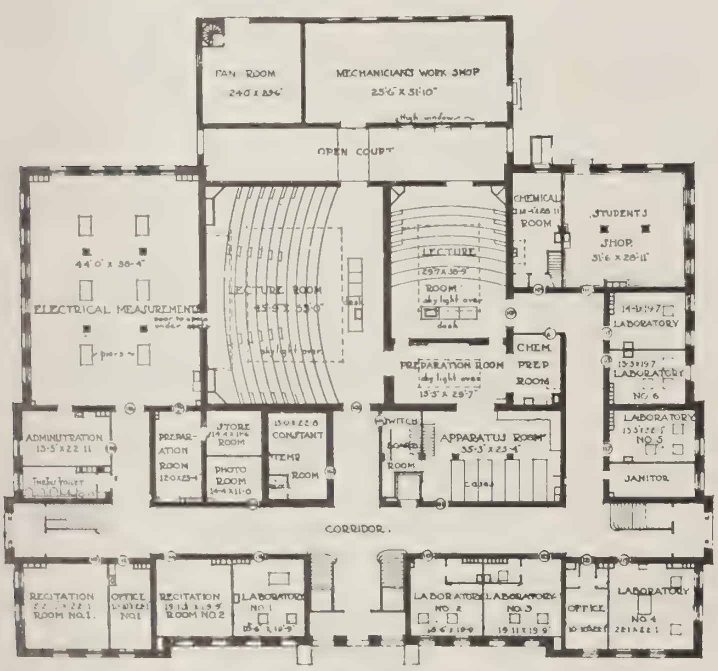
building is concentrated in the students' workshop at the northeast corner. The floor of this room is a thick block of reinforced concrete floated on 18 inches of sand and is independent of the walls and foundations. On this are mounted several machine tools with shafting and motor for the use of instructors and advanced students. This method of isolating machinery has been used in several laboratories and found satisfactory. It would of course be easy to restrict work in this shop at times if any par-

Bureau of Standards. These laboratories do not depend upon the basement for delicate experimental work. The objections to basement rooms are that they are not cheerful and that they are liable to be damp at certain seasons of the year. In the level prairie country with the black soil of the "corn belt," basement rooms are certainly not desirable where long hours must be spent in experimental work. While we have a large basement cemented throughout, part of it is cut by the ventilating ducts and

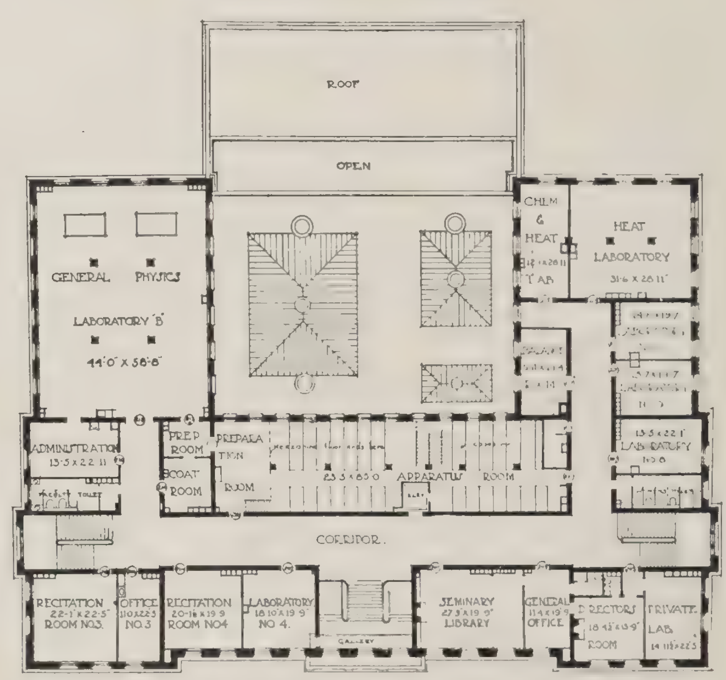


LABORATORY OF PHYSICS THIRD FLOOR

LABORATORY OF PHYSICS—FOURTH FLOOR



LABORATORY OF PHYSICS—FIRST FLOOR



LABORATORY OF PHYSICS—SECOND FLOOR

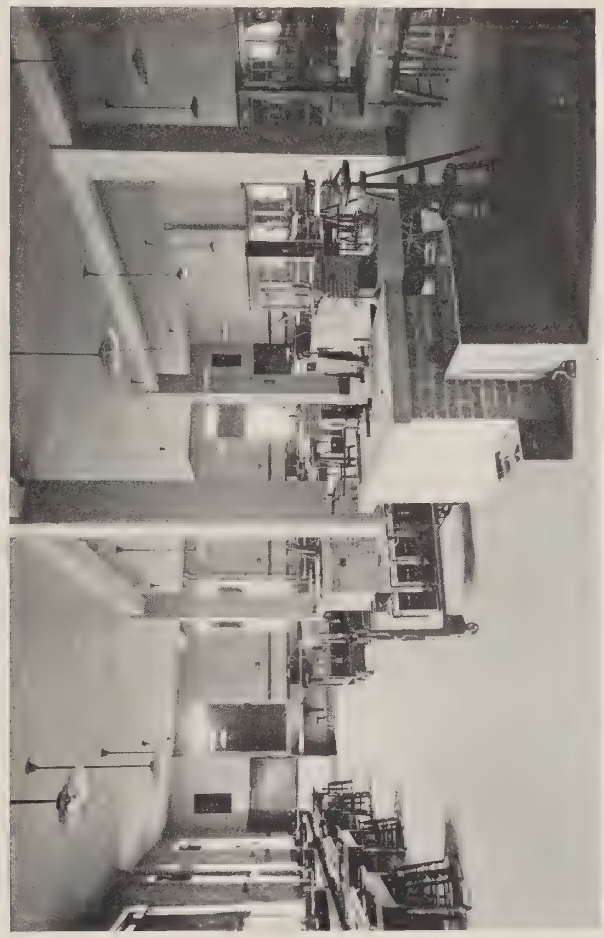
LABORATORY OF PHYSICS, UNIVERSITY OF ILLINOIS, URBANA, ILL.
W. Carbys Zimmermann, Architect.

ticular experimental work was disturbed, but our experience indicates that this will rarely occur. As heat and electric power come from the University power plant we have had no problem with boilers and prime-motors.

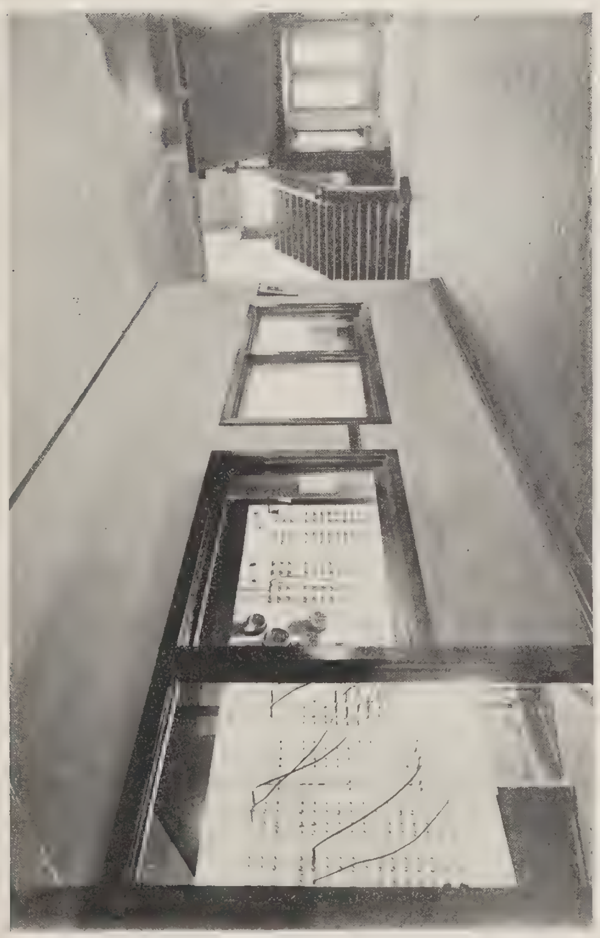
An equally important question was the use of the basement. Many professors regard the basement as the choicest room on account of its stability. That it is not necessary to go to the basement for stability is shown by the two fine research laboratories in Washington, the Geophysical Laboratory and the Laboratory of the

the piping, and part is used for even-temperature rooms, a large battery room, and storage room, much needed in working laboratories. All the first floor laboratories and the lecture room desks have independent masonry piers for experiments. The wall brackets have, however, been found equally stable. Even on the upper floors the wall brackets have been satisfactory for all general purposes and are particularly good near the intersections with the cross walls.

There are occasionally demands of stability made by



PRECISION MEASUREMENT LABORATORY.



EXPERIMENTAL SWITCHBOARD.

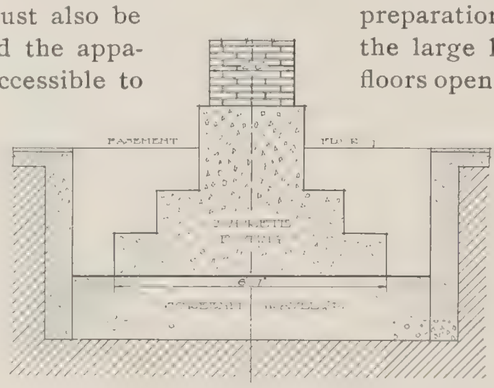
LECTURE ROOM.

PREPARATION ROOM FOR LABORATORY.

INTERIOR VIEWS, LABORATORY OF PHYSICS, UNIVERSITY OF ILLINOIS, URBANA, ILL.

physical experiments which test to the limit the standard masonry pier. To meet this exceptional but important demand three special piers were constructed after the plan shown in the accompanying illustration. A heavy block of concrete was built on a thick bed of loose gravel. By using oil cloth over the gravel the concrete formed without becoming part of the gravel, and was thus "floated" on the gravel. The pier was then erected in this floating foundation. The loose gravel transmits few if any vibrations and the inertia of the heavy concrete foundation and pier is an additional protection against vibrations. A pier of this kind will stand the test of a free mercury surface.

While stability is demanded in a physical laboratory, the question of convenient arrangements, service rooms and "circulation" or ready access is none the less important in a laboratory as large as this one. The first question in arrangement was the location of the large experimental lecture room. A lecture room requires higher ceilings than the ordinary room on account of the raised seats and its size. It must also be convenient to a preparation room and the apparatus cabinets, and should be easily accessible to the auditors. To obtain the higher ceiling without breaking floor levels the lecture room is often put on the top floor. This would have involved in our case a climb of two or perhaps three flights of stairs which was undesirable for several reasons. The problem was finally solved by using the court between the wings for two lecture rooms and a preparation room. The access is easy and the location reduces the disturbance of the coming and going to a minimum. The lighting is by skylights with a north exposure and no side-lights; allowing the room to be quickly and completely darkened by horizontal screens rolling on tracks between the skylights and the glass ceiling. The size of the lecture rooms forms a question on which there is evidently much difference of opinion. After a thorough test it was decided that 50 feet should be the maximum distance of any seat from the lecture desk for an experimental lecture. Using a standard opera chair with folding tablet arm there are 265 seats within this radius, which number is ample since, for teaching efficiency, a lecture section of over 200 is undesirable. The second lecture room seats 120 and shares the preparation room with the larger lecture room. An apparently minor point that caused much thought in the lecture room design was the position of the entrance. A rear entrance is undesirable because it is not in full view of the lecturer and so encourages tardiness. The entrance should be placed so as not to interfere with the passage from the desk to the preparation room. In a physics lecture room it is desirable to have a diagonal curtain across one front corner so that a lantern can be operated for projecting experiments. These requirements are met very satisfactorily in the larger lecture room and fairly so in the smaller lecture rooms. There is a scheme used in some foreign laboratories of having the entrance to the preparation room and cabinets directly back of the lecture desk, with sliding blackboards and a projection curtain coming down over this entrance. It seems, however, better to keep the needed blackboard and curtain independent of an entrance.



STANDARD EXPERIMENTAL PIER FOUNDATION IN THE PHYSICS BUILDING UNIVERSITY OF ILLINOIS

The location and arrangement of the apparatus cabinets is a special feature of the design. These are placed in the north central part of the building and extend through three stories. The principle of the library stack is used, a mezzanine floor being introduced on each story. This scheme practically doubles the available apparatus room. These stacks are accessible from each corridor by a special stairway and by an elevator. The elevator shaft runs from the unpacking room in the basement to the fourth floor and has openings to the main corridor on each floor, and also to each of the six floors with apparatus stacks. By using large rubber-tired trucks which can be run on the elevator it is easy to transfer heavy apparatus to any part of the building. The central location of these apparatus stacks makes them convenient to all the working rooms of the building. Indeed the preparation rooms for the lecture rooms and for the large laboratories on the second and third floors open directly into these stacks. In addition to these central cases each small laboratory is fitted with a case for the apparatus and supplies which are in current use in that room.

For each large laboratory there is a preparation room supplied with facilities for adjusting apparatus and making minor repairs, and also an administration office with assistants' desks where reports are corrected and records kept. On each floor there is a chemical room and one or more photographic rooms. Interior dark rooms are also found in several of the smaller laboratories. Some of these laboratories are fitted with double curtains held in place by deep side slots so that the room can be easily darkened for ordinary purposes. The device of using double curtains bound together but mounted on separate spring rollers fixed vertically over each other is due to Prof. D. C. Miller. It is inexpensive and satisfactory.

The class rooms, seminary room, offices, coat rooms, etc., involve no questions peculiar to laboratory design. The experimental electric circuits and switchboards, and the distribution of gas, water, and compressed air are important features in a modern laboratory, but they are perhaps more in the nature of equipment rather than subjects of design. For the extension of this wiring and piping either temporary or permanent accessible shafts are provided in all parts of the building. This provision cannot be neglected in a fire-proof building.

The fourth floor is also completely finished. It contains extensive photographic rooms with a large north skylight and rooms which are available for various experiments in light, sound, and electric waves. There are no special points of design involved in the planning of this floor.

In addition to the question of general design in the planning of a laboratory there arise many questions in the design of the individual rooms and in their fittings, but these questions of detail are beyond the purpose of this paper.

Legal Hints for Architects. — Part VI.

WILLIAM L. BOWMAN, C.E., LL. B.

Architect's Authority. While our considerations of the duties of the architect have naturally given us a general knowledge of his authority, yet, even at a risk of some repetition, it is felt that a more specific consideration of this most important subject is essential. The legal status of an architect may vary considerably by reason of or during an employment. There have been instances recorded where he has been not only agent for the owner but also for the contractor, an independent contractor himself and also an arbitrator or quasi-judicial officer. This statement in itself shows how careful an architect must be not only in the various engagements which he may accept upon a single job but in his actions and decisions, torn as he usually is by many opposing claims of interest and acting as he frequently does in situations which require determinations and decisions adverse to his own personal interests. The architect well knows that primarily he is the agent of the owner, the man who pays him and he acts accordingly, but he often fails to remember that he cannot act for or receive compensation in any way, shape or form from a contractor, subcontractor or material-man without securing the previous consent of his employer. This matter has just lately been considered in an important decision. An architect who had the usual contract of employment with an owner contracted with a certain firm of engineers without the knowledge of his employer and without telling him about the arrangement, whereby the engineers were to prepare the plans and specifications for the mechanical equipment of the building, with the understanding that if they obtained the contract for the work they would make no charge for such plans and specifications so prepared. Later these engineers did get the contract, being the only bidders. As a matter of fact the arrangement did not in any way increase or decrease the amount which the owner paid for his complete plans and specifications. After the owner learned the facts he refused to pay the architect, and upon action brought for the architectural services the court held that the contract was severable, and by this breach of duty upon the part of the architect, he had thereby destroyed his right to compensation for any part of the contract in which the arrangement could have any bearing or influence. The court then decided that upon these facts the architect could not recover for superintendence nor for the furnishing of the completed plans and specifications, or in other words he could only recover for his preliminary plans and specifications. This seems a very drastic decision under the circumstances, but the opinion states that it is based upon sound public policy and asks the following pertinent inquiry: "Under these circumstances, how could they (the architects) give their best judgment and experience, to say nothing of good faith, in passing upon the working plans furnished by McW. & Co., or in advising their principal as to the best bid for furnishing and installing the mechanical equipment?"

This principle of fair dealing with the employer and owner entitles him after knowledge of any surreptitious dealing between the architect and any other person connected with the work to dismiss the architect. In addition to the loss of employment such architect may be sued and the employer permitted to recover not only whatever money the architect has secretly received but even the commissions earned and previously received from the employer.

As the owner's agent, the architect is spoken of either as the general agent for all purposes within the contract, or as a special agent with limited powers. From the standpoint of the architect he should consider himself a special agent and construe his authority strictly. The general rule of agency as between the employer and a third party is "that the extent of the agent's authority is to be measured by the extent of his usual employment." Hence as a practical matter the architect's authority must be gathered from the clauses of the building contract, the general conditions of the specifications, and as they can be inferred from the acts of the employer or by custom. The contractor is not bound by any special instructions given the architect by his employer which are not made known to him. For example, if there is a secret arrangement that the building shall not cost more than a certain sum, and where the builder is by the contract bound to obey the directions of the architect as to the work he shall do, such secret agreement is not binding upon the builder, and such restriction of the architect's authority will not be permitted to prejudice the builder's rights.

Where the limits of the architect's authority are clearly set out in the building contract, such authority must be strictly followed, but at the same time the authority given will be ordinarily construed to include permission to use all necessary or even usual means of carrying into effect the purpose and intent of the employer. Regarding these implied powers, a few examples will be given to show their application. There could be no implied authority of the architect to allow adjoining owners to build the projecting ends of their girders or roof beams into the wall of the house, but a provision that all extras or additions should be paid for at the price fixed by the architect does imply power in said architect to determine what are extras under the contract. The mere employment of an architect by an owner cannot imply authority to select and engage a contractor for the work, although in England employment would probably give the architect power to engage a quantity surveyor to take out the quantities. Thus it will be seen that the implied authority of the architect must depend chiefly on direct and clear inference from the express terms of the building contract or on custom.

Speaking generally then, as the owner's agent the architect is intrusted only with power to see that the works and building construction contemplated by the contract are properly executed and completed. He cannot obtain bids nor enter into a contract for his employer, nor can he change, alter, or modify such a contract or its conditions. If there are omissions in the plans and specifications, the architect has no implied authority to

order such omissions, and this is true even if the plans and specifications are impracticable as they exist. An architect cannot invite people into a building being constructed and thereby render his employer liable for any damages accruing to such persons by reason of the defects of the building. The weight of authority seems to be that an architect cannot waive the contract conditions as to the method of ordering extras, additions, etc., nor the contract conditions as to payment and architect's certificates. A verbal extension of time to complete a building given where the contract has a time limit and requires a written extension has been held not to bind the owner nor enable the contractor to take advantage of such honest and equitable extension. The architect cannot receive or disburse moneys for the owner unless specially authorized. As agent of the owner he probably does not warrant the plans and specifications as correct, nor that the work can be successfully executed according to said plans and specifications. Notice that this merely means that a builder can not recover from the owner damages for such defects, or in case of accident the person injured cannot recover his damages from the owner. In this phase of the employment the architect is considered an independent contractor, and as such he is personally liable for defects in his plans and specifications or for his failure to reasonably superintend.

The result of acting without authority will now be briefly stated so that it may be kept in mind when we come to consider the various building contract clauses of interest herein. Where the architect orders material or work professing to act for his employer, he impliedly warrants to the contractor or subcontractor that he in fact possesses the authority which he assumes to exercise, and for the breach of such warranty he becomes liable for the damages suffered. If the architect's action is with knowledge that he does not possess the authority, it is probable that he could be held liable by the contractor for the damages in an action for deceit. Again, if, as has happened, the contractor first sues the owner who wins the case on the ground that the architect had no authority to order the material or work in question, then upon action brought against the architect the contractor can recover not only for the material and work which he furnished, but also as damages recover the expenses of his action lost to the owner.

As has already been shown, in the ordinary everyday employment of an architect there is no specific and definite contract of employment, so that the architect has to depend principally upon the building contract to ascertain his legal position and rights. On this account we will continue our consideration of this subject in connection with our consideration of the most common contract clauses now in general use.

Contract Clauses. Experience has shown that the early contract statement, "which drawings and specifications are identified by the signatures of the parties hereto," is often neglected, thereby causing much trouble. The contract is always made in duplicate and signed and exchanged by the parties thereto; why should not the same method be followed regarding the plans and specifications which are the real basis of the contract? Any disputes or lawsuits over a building contract always involve the architect, and it is to his interest, not only professionally but also from a financial standpoint, to do everything in his power to prevent misunderstandings and legal proceedings as far as possible.

Since the plans and specifications "become hereby a part of this contract," the architect should take care that his "General Conditions" in the specifications are consistent with the contract. There seems to be a necessary conflict in this regard because in such general conditions the architect always tries to relieve himself of as much responsibility as possible, while the owner in drawing or having the building contract drawn is primarily thinking of the obligations which the builder and he are about to assume. While the general rule of construction is that the contract clauses control the general conditions of the specifications, yet there is also a legal rule of construction that where it is possible each and every part of a contract (including the plans and specifications) must be given its full meaning. Hence the conflicts between the contract clauses and the general conditions are a constant source of mischief and litigation which with more care on the part of the architect could probably be avoided. This raises another interesting question for the architect. Suppose the architect has general conditions containing the following: "The architects do not assume any responsibility of any kind, financial or otherwise, in issuing these instruments of service, but are considered simply as advisers of the owner," and the owner refuses to accept such a condition and the architect refuses to change it. Such a situation did arise after an owner had accepted the completed plans and specifications and was about to sign a contract with a builder, with the result that the architects were dismissed and had to sue for their commission. The trial justice held that it was a question of fact for the jury to decide whether or not the refusal of the architects to omit that clause constituted a breach of their contract of employment. Unquestionably the architects in such a case should recover for the work done, the contract being severable, and the only question of difficulty is whether the owner could dismiss them and cause them to lose the profits which they would have made upon the superintendence.

The phrase requiring performance "under the direction" of the architect must be considered in connection with the intent and purpose of the contract as a whole. It has been held that these words do not authorize the architect to reduce the thickness of a concrete column foundation. Yet in another case where there were numerous different contractors, each of whom was required to furnish his own scaffolding, the architect, to hasten matters, first arranged with each contractor to have his share towards paying the carpenter to furnish all the scaffolding deducted by the owner from his contract price and then ordered the carpenter to do the work. Later the owner refused to pay the carpenter, but a recovery was permitted upon the ground that the owner did not suffer any from the change in the method of procedure and the architect had thereby hastened the construction of the building, which was one of the objects of his agency. This important phrase is ordinarily taken to refer to the sufficiency and character of the materials to be used and the work done, and does not confer power upon the architect to make a change in the materials named in the specifications.

The phrase just considered is often expanded into the form "under the direction and to the satisfaction of" a certain architect, which has also received much legal attention. One of the best considered cases states this to require "only such supervision and direction by the architect looking to the execution and completion of the work according to the plans and specifications as may be proper to be given to effect that end. Such provision makes it the duty of the architect to see that the contract is complied with, not violated." In some jurisdictions the requirement of the satisfaction of the architect is held to constitute the architect the sole arbiter between the parties. Then the architect steps from his position of an employee of the owner and enters upon that sacred judicial duty of deciding fairly, honestly and impartially between two interested parties. This again brings us to the question which has already been touched upon, what is or should be "satisfaction" of the architect. It means legal satisfaction or in a manner satisfactory to the mind of a reasonable man. If the work has been performed *substantially* in compliance with the contract, the law will hold the architect to be satisfied.

Most important in this connection is the theory of substantial performance now almost universal and which seems to have escaped the attention of many architects. This is an equitable principle which the courts have established to prevent the forfeiture by a contractor of his money and the unjust enrichment of the owner when the owner or architect on technical or frivolous objections refuse to pay the contractor. Where the defects or omissions by a contractor are not numerous or are unimportant, technical, or inadvertent, and where there has been a *bona fide* attempt to perform upon the contractor's part, then such contractor can recover from the owner certain compensation even without the architect's certificate or satisfaction, etc. Such recovery or compensation is ordinarily the contract price less a reasonable sum for the omissions or defects. It is interesting to note what the courts have considered a substantial performance. One of the controlling features is the relation of the value of uncompleted, omitted or defective work to the contract price. The following are a few examples of substantial performance: Contract price $200, defects $25; contract price $800, defects $75; contract price $2,000, work unperformed $120; contract price $7,000, defects $275; contract price $12,650, deviations from plans, etc., $380.20; contract price $48,000, unfinished work $2,274.92, the owner taking possession and refusing to pay over any of $14,209.37 retains; contract price $231,698, where the owner claimed defects of $6,329, while the contractor admitted $406, and where the contractor claimed $29,150 for extras and the owner admitted $6,155. As for the character of work or omissions or deviations which have been allowed as substantial performance, the following are from different court decisions: 1. Where some woodwork was not properly grained and finished; 2. where the size and kind of rafters were changed without injury to the house; 3. where the boards used for clapboards and flooring were wider than specifications, but where the usefulness and value of the house were not impaired; 4. where the tie rods in the cement floor were omitted; 5. where some clothes closets did not receive the three coats of plaster; 6. where in the foundation walls the header course was put every three feet instead of two, no sill made for rear cellar window, only one row of cross-bridging in each tier of beams instead of two, no anchors furnished for the first floor, one flue left rough, in the header courses requiring perfect brick and also where brick with no defects were specified many half bricks had been put in; 7. and even where the roof and chimneys of a house were not well supported, the folding doors were not well hung and casings thereto not well fastened, the tarpaper and clapboards in some few instances were not well put on, one door and casing were not fitted so that the door would shut, the roof sagged but seemed tight, which defect could be remedied by putting supports under it which could be done without disturbing the other parts of the house or its occupants.

We can now deduce a practical rule for substantial performance of contracts under $25,000, that, provided the contractor has honestly attempted to complete his contract and particularly where he has followed the directions of the architect or owner, and where the omissions or defects do not pervade the whole work or make the object of the parties impossible or difficult of accomplishment, or where the usefulness or value of the construction is not materially impaired, and provided that the cost or reasonable value of correcting such defects or omissions does not exceed six per cent of the contract price, then there has been a substantial performance. The same rule with the exception of the percentage is applicable for contracts above $25,000, but no fixed percentage can be given or is deducible from the adjudicated cases. Each case must be governed by its own particular circumstances. The rule of compensation in such cases varies, the owner being allowed either the cost of completing the work or correcting the defects, provided it is reasonable or the difference between the value of the building which he has and the building he would have had if it had been erected strictly in conformity with the plans and specifications. These cases permit recovery without the architect's certificate, which would seem to imply that under such circumstances an architect should at least issue a certificate of substantial performance.

In view of these considerations it would seem that the architect can save much time and expense for all concerned if he issues a certificate of substantial performance instead of absolutely refusing any certificate as is the custom to-day. Provided the architect acts honestly, fairly, and reasonably in his determination of the balance due instead of making the owner confirmed in his opinion that the architect is solely his employee, there is a great opportunity here for the architect, since many times both owner and contractor will be willing to accept the compromise balance due and so fixed rather than become involved in a lawsuit with its attendant delays and expense.

In some jurisdictions where the satisfaction of an architect is required, it is practically held that the only excuse whereby a contractor can prevent a forfeiture of his money is by showing a fraudulent collusion between the owner and the architect, and that the question of good faith on the part of the architect is immaterial. This certainly requires that an architect in such jurisdictions

should look well to his determinations and should have substantial, honest and legal grounds for refusing to declare his satisfaction. Especially is this so where the contractor has tried to follow the plans and specifications and put into the building only those materials accepted by the architect; where all the work has been done under the eyes of the architect or his clerk; and where the omissions and defects were principally, if not entirely, due to unauthorized changes or alterations permitted or ordered by the architect or his clerk.

Some contracts require "the satisfaction of owner and architect." Even with such a requirement it is held that if the materials furnished were satisfactory to the owner's agent or architect on the ground and the work was done according to plans and specifications, the contractor was entitled to recover. In another instance the acceptance by the architect was held to bind the owner. Where the architect expected that his plans and specifications would give a water-tight job, yet if the contractor has conformed to such plans and specifications which did not produce such a job, at law the architect and owner must be satisfied.

The contract requirement of this nature which seems to give the architect the most trouble is the "satisfaction of the owner." Where that is a contract requirement or the sole requirement, the architect should not on that ground refuse to issue his certificates because that clause has nothing to do with him or his certificates. The mere fact that he knows that the owner will not pay upon the certificate or even that he is told not to issue the certificate because the work is unsatisfactory should not deter the architect from performing his legal and moral duty. It might be noted that an owner's objection must be in good faith, and it is always a jury question whether as a matter of fact the work is well done or not. Where the work is done under the supervision of the owner and his directions are followed in the execution of the work, then his refusal to be satisfied when the work is completed has little legal effect.

Another viewpoint of the "direction" of the architect is very important, namely, the responsibility where such direction is the cause of a result not contemplated by the contract. In municipal contracts it is held that this word relates to the results to be obtained, and did not make the contractor the servant of the city. Where earth was directed to be piled against a cement bulkhead while it was not yet set, against the objection and protest of the contractor, which caused a cracking of the bulkhead, held that the contractor was not liable for the defect. Where a defect was due to the inferior quality of sand used, the contract requiring that the sand should be taken from the premises, which was done over the contractor's objection, held no defense to the contractor's action for a balance due him. Where the owner is to supply something and later, trouble can be traced to the material so furnished or to the lack of such materials, and where the work has been done under the direction of the architect, naturally the contractor is not responsible for such defective work, or because the construction does not serve the purpose for which it was erected.

Still another form of this contract requirement needs some attention, to wit, "under the direction and to the satisfaction of A.B., architect acting for the purposes of this contract as agent of the owner." While it is probable that the powers and authority of the architect are somewhat more broadly construed under this form, yet in view of the latest case upon this expression, but little practical difference can be seen. Under this clause the architect has no authority to waive the protective provisions of the contract for the owner or its various conditions. It is probable that in the matter of using somewhat different but equally good materials, or in making immaterial changes, that this form allows the architect more freedom. Practically then, it is a better and safer form for the architect than the present uniform contract expression.

There has been a question raised as to whether the common clause that the architect's decision "as to the true construction and meaning of the drawings and specifications shall be final" was legally valid. Just lately it has been held so by the Supreme Court of the United States. Another court states, however, that it implies a condition that the architect's decision shall be honest. The action of an architect under this clause is considered as the award of a referee under a submission to arbitration. This is a unique position for the architect as he is not bound by any oath or public professional declaration to act fairly and honestly between the parties in this respect. This phrase does not give the architect power to determine what the contract between the parties is, or to construe the contract; the arbitration as stated merely covers the "drawings and specifications." The fact that it does not mention the contract seems to have escaped the notice of many architects, as is shown by their actions. It is hardly necessary to state that this does not give the architect the power to require of the contractor what is not in his contract. In his determinations under this authority the architect must keep in mind several very general legal propositions; that he must as far as possible follow the strict wording; that requirements should be interpreted in the sense in which the contractor would naturally understand them; if there are conflicting provisions, they should be construed most strongly against the party to the contract who drew or had drawn the contract, plans and specifications; the specifications should be considered as a whole if there is any conflict in the various parts; proper and due consideration must be had of the character and cost of a building and its comtemplated use; and above all he must act and decide honestly even if it requires a decision which shows mistakes, carelessness, or negligence in his plans or specifications.

A few judicial determinations of questions arising upon specifications will show the manner and way in which the architect should act. The ordinary architect in his decisions is so prone to fall back upon his clauses that the materials must be the "best," and the work done in a "good workmanlike manner," that he must realize that those expressions depend upon personal opinion, and he must not be too arbitrary in *his* personal opinion. If it comes to a lawsuit, it becomes a question for the jury and they ordinarily have little sympathy with arbitrary, technical, and often unreasonable professional opinions and requirements. In a very recent case "good workmanlike manner" was held to mean

with fair average skill, and not with the highest skill known to the trade. In another instance it was held to relate to the thing specified to be done, and could not be construed to require the contractor to erect a pier or place an iron column under the end of a girder, which was not contemplated by the contract. Where a foundation was required "to be made perfectly water-tight and guaranteed," it was held that did not constitute a guaranty by the contractor that the cellar should be water-tight where the specifications prescribed in detail the manner of construction and the material to be used, but was a guaranty only of the contractor's compliance with the specifications, and of the effectiveness of his work in matters about which he had a discretion. A contractor to do all the "carpentry" or "carpenter work" is not required to cover a roof with tin, or to furnish iron window frames. Upon a bidding the work specified was "for an iron inner dome and other ornamental iron" for a State Capitol, but that could not be held to include copper bronze statues.

Regarding the determination of the materials which are usable, the courts have shown a reasonableness and practical construction at great contrast with many of the decisions of some superintending architects. Where "sandstone of a quality approved by the architect" was required, and the architect thereupon ordered "the best sandstone that can be procured," it was held that such was not the stone contracted for, and the contractor could recover from the owner for the difference of cost to him caused by the architect's order. Another contract called for "Wilkeson stone," and there was only one quarry of that kind of stone open at the time of the signing of the contract. The architect refused to let the contractor open another quarry of the same stone, but required him to get the stone from this one open quarry. It was held that his decision was wrong and improper. Specifications called for "San Domingo mahogany," and it being shown that that was a trade name in the locality meaning any good figured mahogany of the same density as San Domingo mahogany, hence the contract was satisfied by a good Mexican mahogany which was approved by the architect. In general the courts say that the contractor is only called upon to do what a fair, reasonable, and practical construction of the plans and specifications require. Further, that where work is done under directions when there is a disagreement between the plans, specifications, and details, that the way said work was done will prevail over the literal meaning of the plans, specifications, and contract.

No comment seems necessary after these examples as to the way that an architect should act and decide when these questions are put before him as an arbitrator.

Undoubtedly much of the hesitation and many of the decisions of architects in the past have been due to the fear of losing their employment. Ordinarily the builder's contract is under seal so that the architect's power under the clause last considered is existing and legal until revoked by the owner by another sealed instrument, and naturally such an attempted rescission of this part of the building agreement by the owner would cause a rescission of the entire contract. This would not give the owner cause to discharge the architect and if he was so discharged he could unquestionably recover for the services already performed and for the profits which he would have made had he been permitted to continue in the employment.

Editorial Comment and Miscellany.

PLATE ILLUSTRATIONS — DESCRIPTION.

Engine House, Baltimore, Md. Plate 159. The exterior is of rough dark red brick of brownish tone laid in cement of natural color, the joints being raked back. The trimming is of Indiana limestone and all woodwork is painted dark green. The walls of first floor are tiled the entire height, while all ceilings throughout are of sheet metal. There is no connection between the hay-loft and the balance of the second story, both as a protection against fire and to prevent dust. The hose shaft is tall enough for hanging the extra hose at full length when drying out. The small cellar at the rear provides for the heating apparatus and coal bunker. The building is non-fireproof. The total cost, including plumbing, heating and wiring, was $25,500. The number of cubic feet measuring from average of roof to first-story floor is 98,637 cubic feet, making the cost price per cubic foot 25 8/10 cents.

HOUSE AT DETROIT, MICH.
Built of gray standard brick made by The Ohio Mining & Manufacturing Company.
Malcomson & Higginsbotham, Architects.

Bank of Yolo, Woodland, Cal. Plates 164–166. The exterior is of a low-toned buff brick with iron spots of considerable variation in size and terra cotta to match. The woodwork of the cornice is stained a golden brown; the terra cotta blocks beneath being a harmonizing shade of green. The tiles of overhang and coping are unglazed and red in color; the columns at entrance of Verde Antique marble with Pavonezza marble used for wainscoting and counter front; base of Verde Antique and floor of white marble. The counter screen is of

STATUE FOR CHURCH OF
ST. DENIS, LOWERRE, N. Y.
Executed in gray terra cotta by the
Atlantic Terra Cotta Company.
Four feet in height.
Chelsea Realty Company, Architects.

bronze-finished Pompeiian green, while the walls and plaster ceiling are painted in ivory tones and stippled. The woodwork is of mahogany. The building is heated and cooled by a blower system in connection with steam coils and water sprays. The total cubical contents are 147,000 feet figured from bottom of footing —2 feet below grade, excepting in boiler room— to top of coping. The total cost of building, including counter and screen together with vault work was $63,000, making the cost per cubic foot approximately 43 cents.

STANDARD DOCUMENTS OF THE A. I. A.

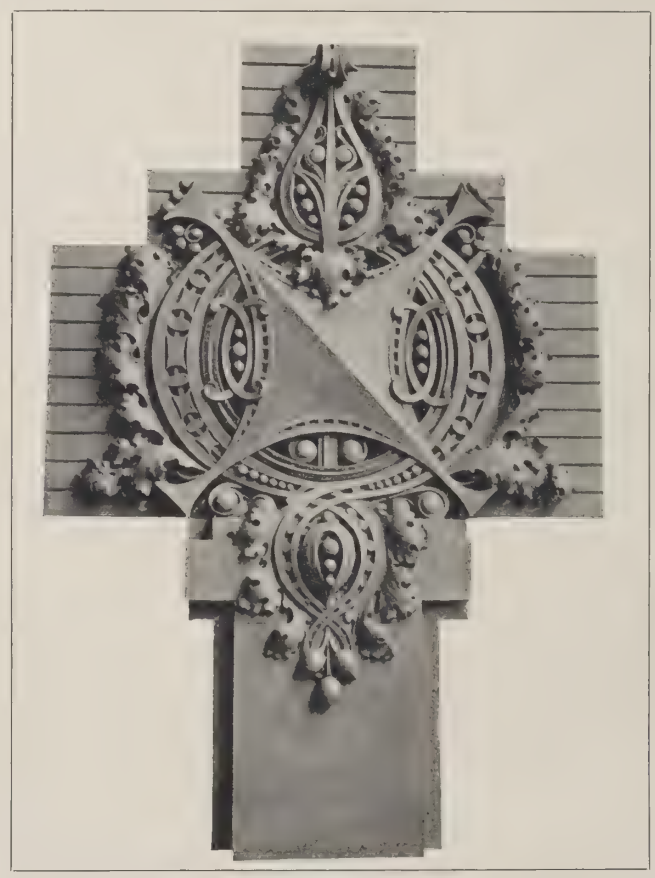
THE Standing Committee on Contracts and Specifications has been at work for five or six years, endeavoring to make the Standard Documents of the American Institute of Architects clear in thought and statement, equitable as between Owner and Contractor, applicable to work of almost all classes, binding in law, and a standard of good practice. The related Standard Forms now approved by the Institute are: Invitation to Bid; Instruction to Bidders; Form of Proposal; Form of Agreement; Form of Bond; and General Conditions of the Contract. These forms are not put forth to diminish the use of the "Uniform Contract," published under the joint auspices of the American Institute of Architects

DETAIL FOR BANK BUILDING.
Executed by The South Amboy Terra Cotta Company.
Joseph Steinam, Architect.

and the National Association of Builders. Advantages of untold value will accrue from the standardizing of documents similar to this, if they can be made to represent the best practice, and by their clearness, equity and

PARK BUILDING, HOBOKEN, N. J.
Built of Natco Hollow Tile made by the National Fire Proofing Company.
James E. Ware & Son, Architects.

final interpretation in courts of law become generally understood and accepted by owners, architects and builders. Provision has been made by the committee for revisions by the Institute at intervals. It is sincerely hoped that through their use and from the criticism of both architects and builders throughout the country, the Standard Documents of the American Institute of Architects will eventually become the basis of all building contracts, as well as a recognized code of procedure, representing the judgment of the Institute as to what, in that respect, constitutes the best practice of the profession. The Standing Committee on Contracts and Specifications has during the preparation of the Standard Forms consisted of the following members of the Institute: Grosvenor Atterbury, chairman; Allen B. Pond, secretary; Frank C. Baldwin; William A. Boring; Frank



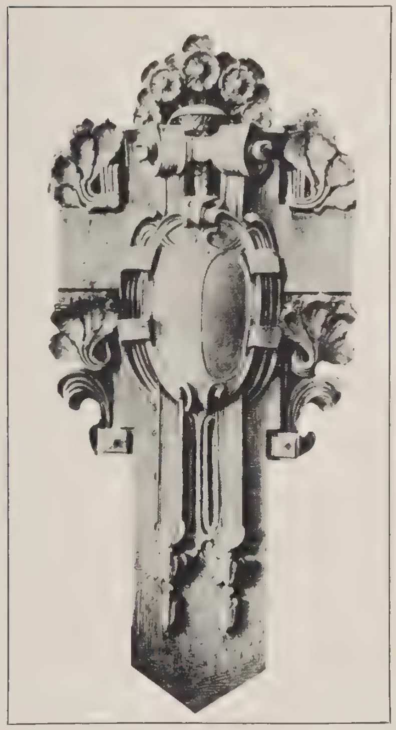
DETAIL FOR STORE BUILDING.
Executed by Conkling-Armstrong Terra Cotta Company.
H. J. Klutho, Architect.

Miles Day; Frank W. Ferguson; G. L. Heins, deceased; Alfred Stone, deceased.

SCHOOL BUILDINGS IN LONDON.

THE London County Council states that, while of secondary importance compared with the teaching staff, the question of the condition and sufficiency of the school buildings must always be one which calls for the continued action on the part of the Council authority. The changes in educational ideals and the movements of population cause the school buildings to become obsolete and the local authority of London always has before it the problem of difficult and costly buildings. The point has often been raised, is it advisable to build any school which will last for more than twenty years? Schools which were built twenty years ago had as few classrooms as possible with a southern aspect, while now it is the custom to plan for a maximum amount of direct sunshine in the rooms. Sanitation, lighting, ventilation, heating, cloak rooms, size of rooms, provision of halls, teachers' rooms, etc., have completely changed and are changing rapidly. In the new schools the feature is the size of the classrooms which are planned to accommodate forty pupils in the case of senior departments, and forty-eight in the infants' departments. The erecting of a domestic economy, or a handicraft center on the same site is included in the contract for the main school. Where the school is to be enlarged in the near future the halls are made of the requisite size to accommodate the completed school. The large schoolroom has given place to the hall; sufficient classrooms are provided so that each class shall have its separate room, and the amount of floor space provided for each child has been raised from 8 sq. ft. to 10 sq. ft.

PITTSBURGH MERCANTILE BUILDING, WOODLAWN, PA.
Built of gray Impervious Brick furnished by the Columbus Brick & Terra Cotta Company.
Rutan & Russell, Architects.



DETAIL BY NEVILLE & BAGGE, ARCHITECTS.
New York Architectural Terra Cotta Company, Makers.

DETAIL BY DWIGHT H. PERKINS, ARCHITECT.
The Northwestern Terra Cotta Company, Makers.

ELECTRIC RAILWAY TO CONNECT ROME WITH OSTIA.

THE scheme of a French company, which is now being considered by the Municipal Government of Rome to connect Rome with Ostia on the coast by an electric railway has revived the conflict between the lovers of ancient and those of modern Rome. The plan includes the tunneling of the Palatine Hill from the Piazza Venezia to the Porta San Paolo, hence cutting under or through the heart of ancient Rome and traversing much of

CARTOUCHE FOR HOTEL.
Executed by The Winkle Terra Cotta Company.
Barnett, Haynes & Barnett, Architects.

LOOSE-WILES FACTORY, MINNEAPOLIS, MINN.
Faced with dark sepia crown tiles, 4 x 12¾ inches in size. An example of the interlocking terra cotta facing tile for factory construction made by the Twin City Brick Company.
Hewitt & Brown, Architects.

what is known as the Zona Monumentale in a more or less deep cutting. Beneath this surface lie hidden many important relics of ancient Rome yet unexplored by the archaeologist. As a member of the Higher Council of Antiquities, Commendatore Boni has again protested against any unnecessary destruction of what should be the objects of future archaeological research by an open railway cutting excavated at a depth which must inevitably carry the railway lines right through their walls.

IN GENERAL.

Goldner and Goldberg, architects, have removed their offices to 391 East 149th street, New York.

Edward G. Garden, architect, fomerly of St. Louis, has removed his offices to Phelan Building, San Francisco.

Charles W. Eldridge has removed his offices to 1227 Granite Building, Rochester, N. Y.

John P. Connellan and Walter H. Cassebeer have formed a copartnership for the practice of architecture, with offices in the Insurance Building, Rochester, N. Y.

Clare C. Hosmer, architect, has withdrawn from the firm of Betts & Hosmer, and opened offices in the Wells Building, Milwaukee, Wisconsin. Manufacturers' catalogues and samples desired.

Rudolph Weaver, architect, has been appointed Professor of Architecture and Supervising Architect at the State College of Washington, Pullman, Washington. Manufacturers' catalogues and samples desired.

The general and sales offices of the Hydraulic-Press Brick Company, Brazil, Indiana, have been removed to the Board of Trade Building, Indianapolis.

Congress Hall, at Sixth and Chestnut streets will be restored under the direction of the Philadelphia Chapter of the A.I.A.

The Indianapolis Architectural Club was organized October 13th with a membership of about forty draftsmen and others interested in architecture and the allied arts. Claude W. Beelman was elected president and S. C. Duvall secretary.

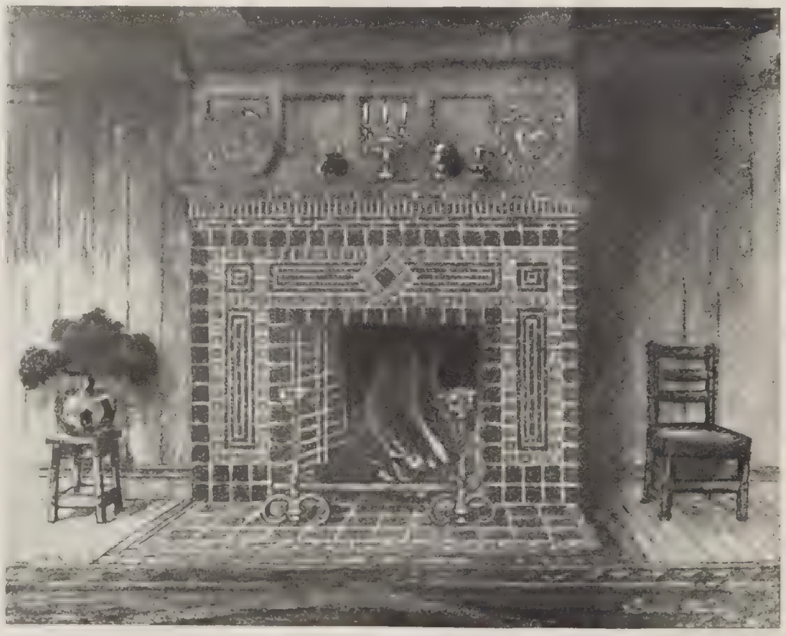
DETAIL BY MATTHEW SULLIVAN, ARCHITECT.
The New Jersey Terra Cotta Company, Makers.

The Pittsburgh Chapter A. I. A. has issued a pamphlet in which is set forth the improvements which are proposed for the city of Pittsburgh.

The 27th annual exhibition of the Architectural League of New York will be held in the building of the American Fine Arts Society, 215 West 57th street, New York City, from January 28th to February 17th inclusive. Exhibits will be received January 11th and 12th only. Exhibits discharged February 19th.

Henry Snyder Kissam, chairman of the committee on education for the Society of Columbia University Architects, announces a series of lectures to be held weekly beginning November 14th and extending to January 23d. These lectures are divided into two courses, one treating of the Theory of Architecture, and the other of the Theory of Professional Practice. Men prominent in architecture and civil engineering will lecture.

Laurence F. Peck announces that he has opened offices for the practice of architecture at 331 Madison avenue, corner of Forty-third street, New York City.



FIREPLACE BY LORD & HEWLETT, ARCHITECTS.
Designed in "Tapestry" brick furnished by Fiske & Co., Inc.

BUILDING OPERATIONS FOR NOVEMBER AND PAST ELEVEN MONTHS.

BUILDING statistics from forty-four representative building centers throughout the country as reported to and compiled by *The American Contractor*, New York, show a loss of 4⅕ per cent for the month of November as compared with November, 1910, whereas the past eleven months show a loss of 2⅗ per cent as compared with the same months of the past year.

OFFICIAL NOTICE.

Office of the County Clerk of Milwaukee County, Wisconsin, Nov. 28, 1911.

TO ARCHITECTS.

NOTICE is hereby given that competitive designs for the new House of Correction will be received at the office of the County Clerk at Milwaukee, Wis., until the first day of February, 1912, at 10 o'clock, A.M. All designs must comply strictly with the rules laid down in the program on file in the office of the county clerk.

Architects desiring to enter this competition must file an application with the county clerk, who will furnish each competitor with a copy of the program and with a topographical map showing the contours of the land and the suggested location for the buildings.

The Jury of Experts who will pass upon the merits of the designs submitted in competition, and who will recommend the award of prizes, is composed as follows: Allan D. Conover, Architect, Madison, Wis.; Richard E. Schmidt, Architect, Chicago, Ill.; Dwight H. Perkins, Architect, Chicago, Ill.; Henry Wolfer, Warden of Minnesota State Prison, Stillwater, Minn.; J. A. Leonard, Superintendent of Ohio State Reformatory, Mansfield, Ohio. Four prizes will be awarded to the successful competitors.

By order of the Joint Committee on House of Correction and Laws, Legislation, and Rules.

Martin Plehn, *County Clerk*.
Milwaukee County, Wis.

BRICKLAYERS' TREATY.

Four Years' Agreement Effected After Many Conferences.

A FOUR years' bricklaying agreement to begin Jan. 1, 1912, has been effected after innumerable conferences since last January, when the old agreement between the Mason Builders' Association and the bricklayers' unions of Greater New York ended. The present wages of 70 cents an hour, with double wages for overtime and Sunday and holiday work, will continue for two years, but for the other two years the wages will be raised to 75 cents an hour. The agreement affects eleven thousand bricklayers. The present wages of 70 cents an hour are said to be the highest ever paid to building mechanics in any city.

WANTED — The 1905 and 1906 volumes of The Brickbuilder, including the special competition numbers. No plates, text only for binding. Must be in good condition. Address Frank J. Saum, 1114 Rutger St., St. Louis, Mo.

COMPETITION FOR A SMALL HOUSE OF THE BUNGALOW TYPE.

To Be Built of Brick.

Cost not to Exceed $3,000.

FIRST PRIZE, $500. **SECOND PRIZE, $250.** **THIRD PRIZE, $150.**
FOURTH PRIZE, $100. **MENTIONS.**

PROGRAM.

THE problem is a small detached house of the Bungalow type. The outer walls and foundations of the house are to be built of Brick.

Three bedrooms must be provided for in the plan. Two of these may be placed in an attic story. Ample basement room is to be provided.

The location may be assumed in any town, small city, or suburb of a large city.

The cost of the house — exclusive of the land — shall not exceed $3,000. The method of heating, the plumbing, other fixures, and finish, to be governed by the limit of cost.

Houses of this type of construction have been built in different sections of the country, and from the data which has been gathered concerning the cost of a number of these houses, an average price of 15 cents per cubic foot has been obtained. This cost is given as the basis upon which the size — figured in cubic feet — of each house submitted in this Competition must be approximated.

Measurements of the house proper must be taken from the outside face of exterior walls and from the level of the basement floor to the average height of all roofs. Porches, verandas, and other additions are to be figured separately at one-fourth (25 per cent) of their total cubage. The cost of porches, etc., is to be included in the total cost of the house ($3,000).

On this basis of figuring — the number of cubic feet multiplied by the cost per cubic foot — the jury will not consider any designs which exceed the limit of cost.

The particular object of this Competition is to encourage the use of Brick for Small Houses. Thousands of houses costing from $2,000 to $3,000 are being built in this country every year. The larger part of them are of wood construction. The cost of brick is very little more and its advantages over wood as a building material are obvious.

DRAWING REQUIRED. (There is to be but one.)

On one sheet a pen and ink perspective, without wash or color, drawn at a scale of 4 feet to the inch. Plans of the first and second floors (if there is a second floor) at a scale of 8 feet to the inch. A section showing construction of exterior wall, with cornice. Heights of floors to be given on section. Enough detail sketches to fill out sheet. In connection with the plan of the first floor show as much of the arrangement of the lot in the immediate vicinity of the house as space will permit. Give on the drawing all measurements used in finding the cubage of house, together with the total cubage. Present this data at a scale which will permit of two-thirds reduction. The plans are to be blocked in solid. A graphic scale must accompany the plans.

The size of the sheet is to be exactly 26 inches by 20 inches. Strong border lines are to be drawn on the sheet 1 inch from edges, giving a space inside the border lines 24 inches by 18 inches. The sheet is to be of white paper and is not to be mounted.

The drawing is to be signed by a *nom de plume* or device, and accompanying same is to be a sealed envelope with the *nom de plume* on the exterior and containing the true name and address of the contestant.

The drawing is be delivered flat, or rolled (packaged so as to prevent creasing or crushing), at the office of THE BRICKBUILDER, 85 Water Street, Boston, Mass., on or before February 15, 1912.

Drawings submitted in this Competition are at owners' risk from time they are sent until returned, although reasonable care will be exercised in their handling and keeping.

The designs will be judged by three or five members of the architectural profession.

First consideration will be given to the fitness of the design, in an æsthetic sense, to the materials employed: Second — excellence of plan.

Drawings which do not meet the requirements of the program will not be considered.

The prize drawings are to become the property of THE BRICKBUILDER and the right is reserved to publish or exhibit any or all of the others. The full name and address of the designer will be given in connection with each design published. Those who wish their drawings returned, except the prize drawings, may have them by enclosing in the sealed envelopes, containing their names, ten cents in stamps.

For the design placed first there will be given a prize of $500.
For the design placed second a prize of $250.
For the design placed third a prize of $150.
For the design placed fourth a prize of $100.

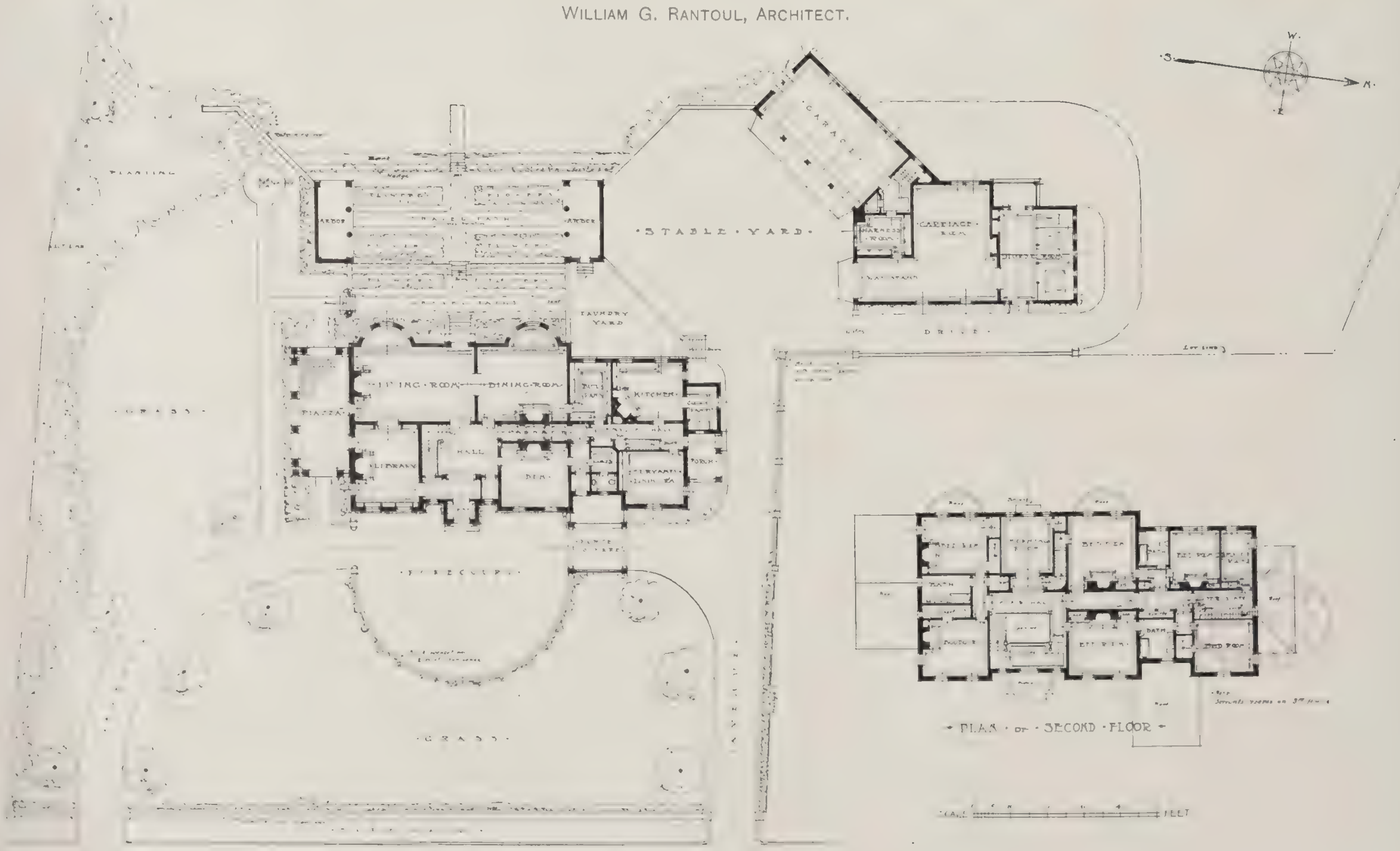
This Competition is open to every one.

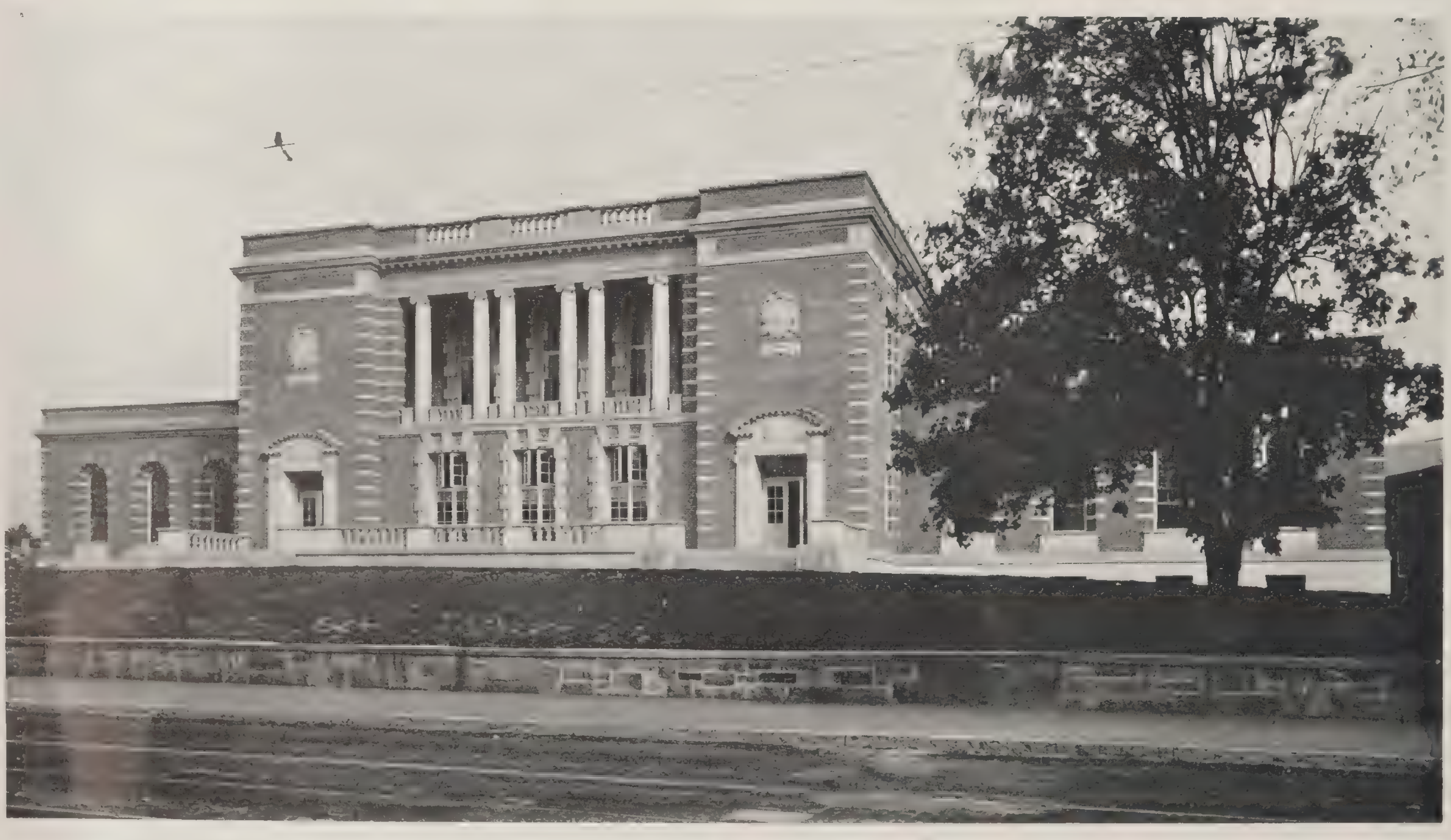
The prize and mention drawings will be published in THE BRICKBUILDER.

This Competition is conducted under the patronage of the International Brick and Clay Products Exposition Company and the drawings will be exhibited at the Clay Products Exposition to be held in the Coliseum, Chicago, March 7 to 12, 1912.

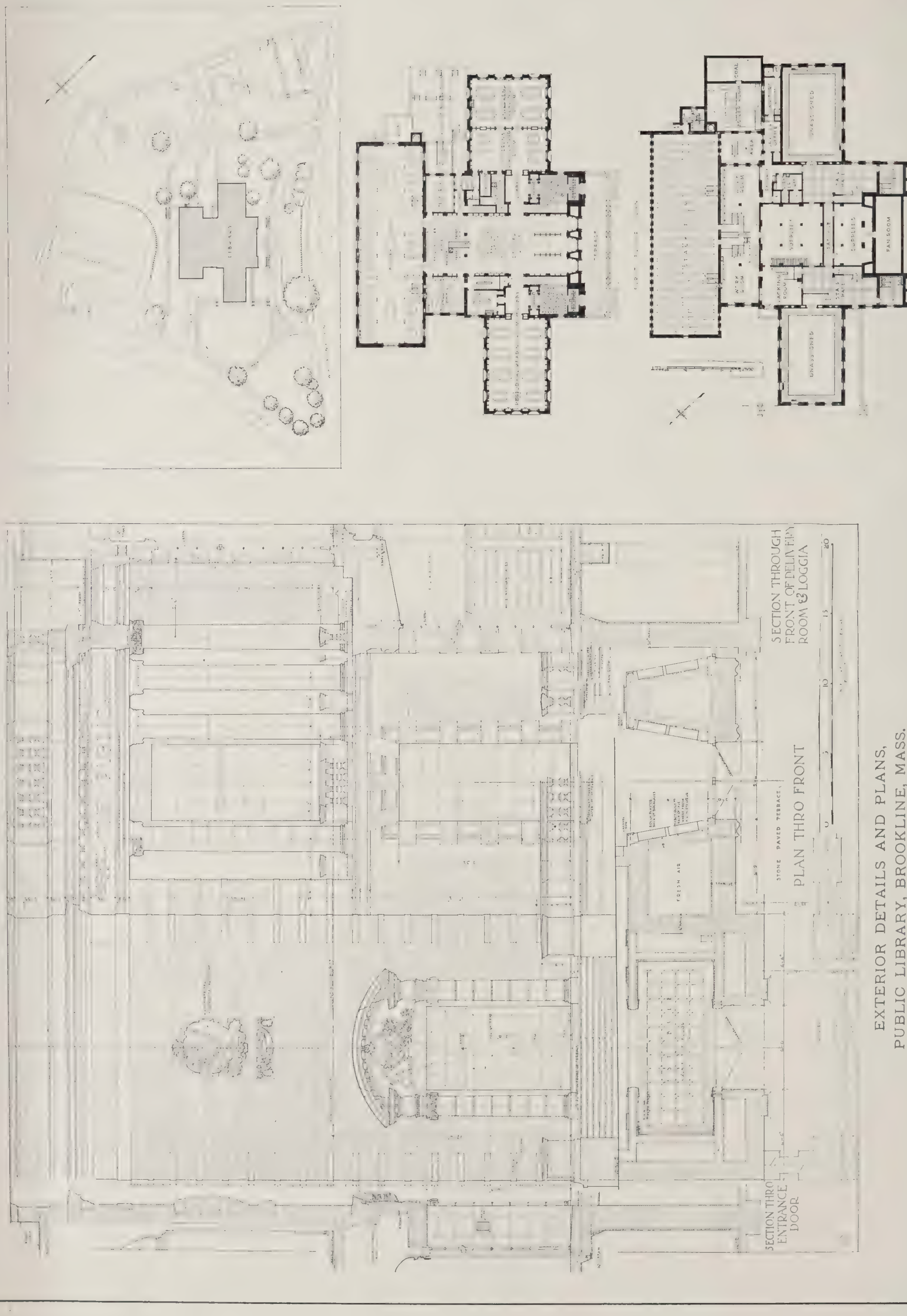
HOUSE AT FITCHBURG, MASS.
WILLIAM G. RANTOUL, ARCHITECT.

HOUSE AT FITCHBURG, MASS.
WILLIAM G. RANTOUL, ARCHITECT.

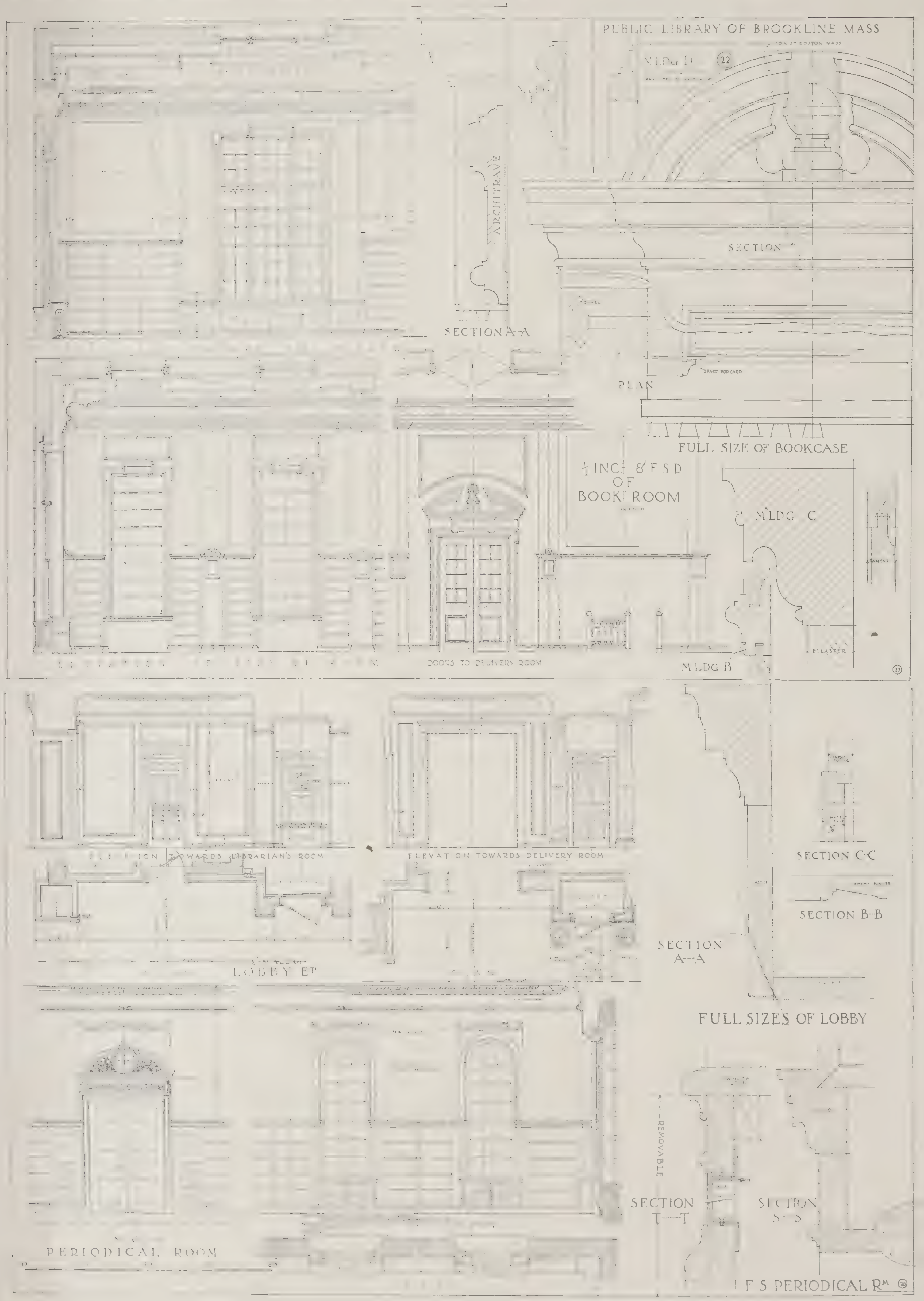




PUBLIC LIBRARY, BROOKLINE, MASS.
R. CLIPSTON STURGIS, ARCHITECT.



EXTERIOR DETAILS AND PLANS,
PUBLIC LIBRARY, BROOKLINE, MASS.
R. CLIPSTON STURGIS, ARCHITECT.



INTERIOR DETAILS, PUBLIC LIBRARY, BROOKLINE, MASS.
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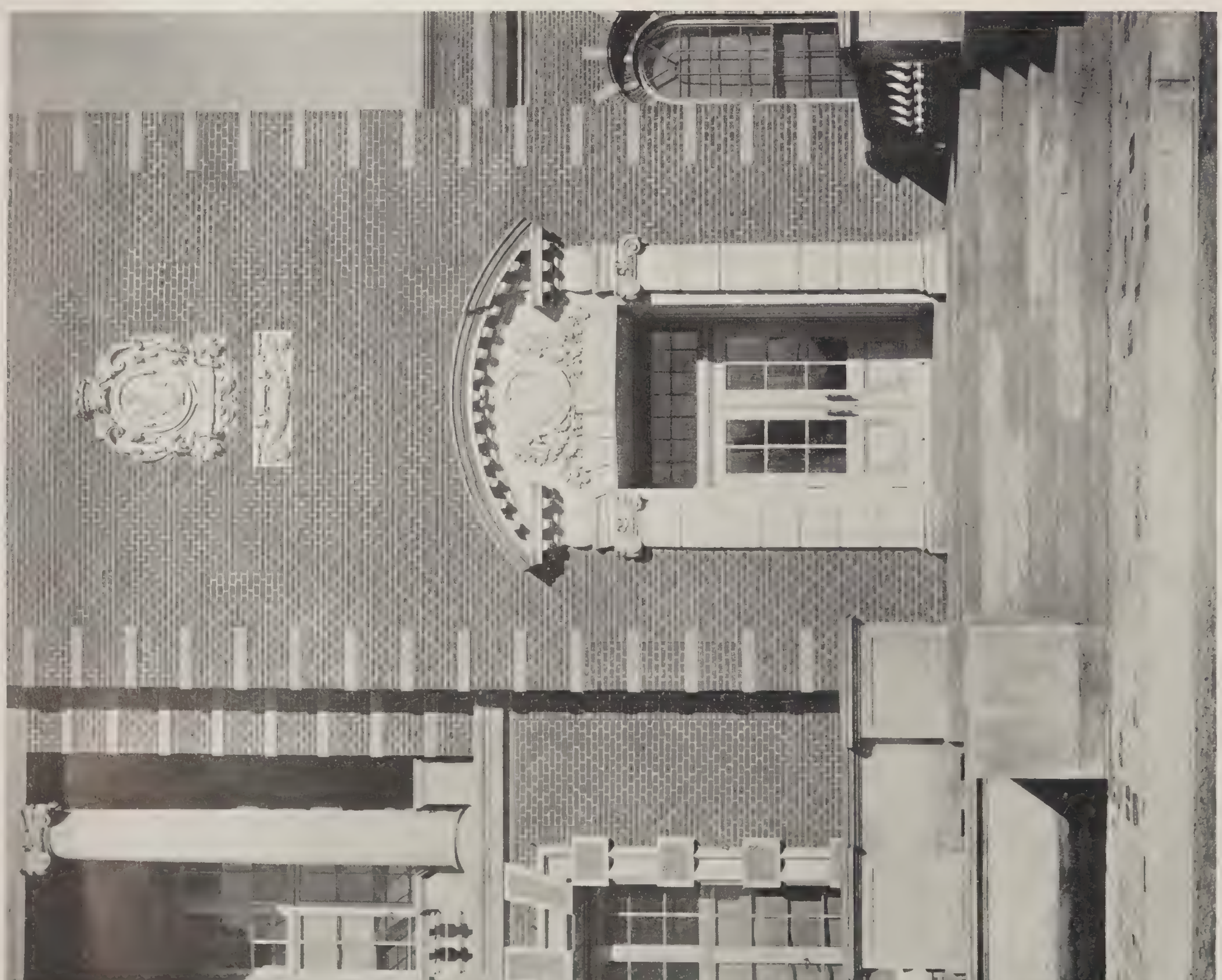


DETAIL OF ENTRANCE.

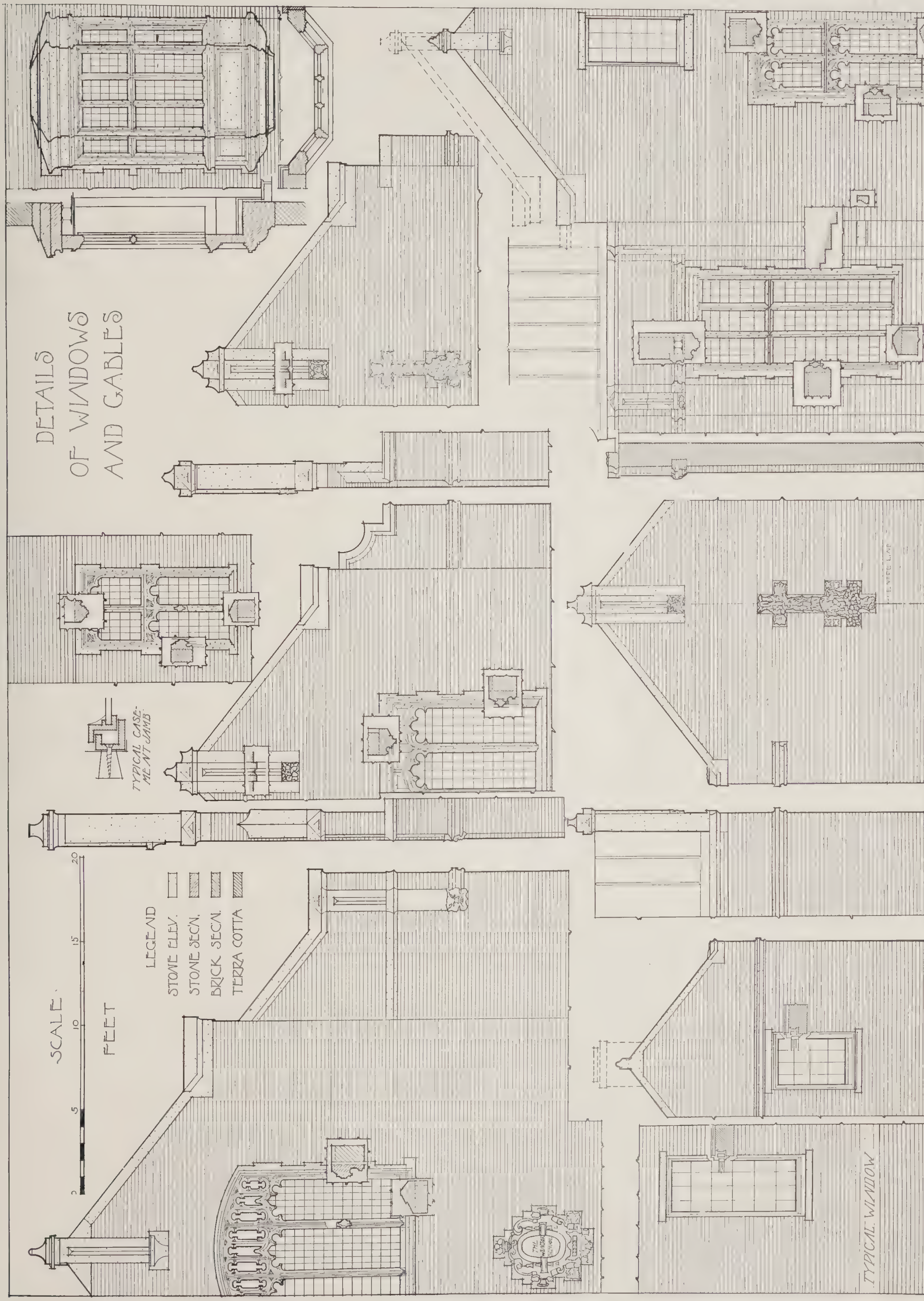
PERIODICAL ROOM.

LOBBY

PUBLIC LIBRARY, BROOKLINE, MASS.
R. CLIPSTON STURGIS, ARCHITECT.

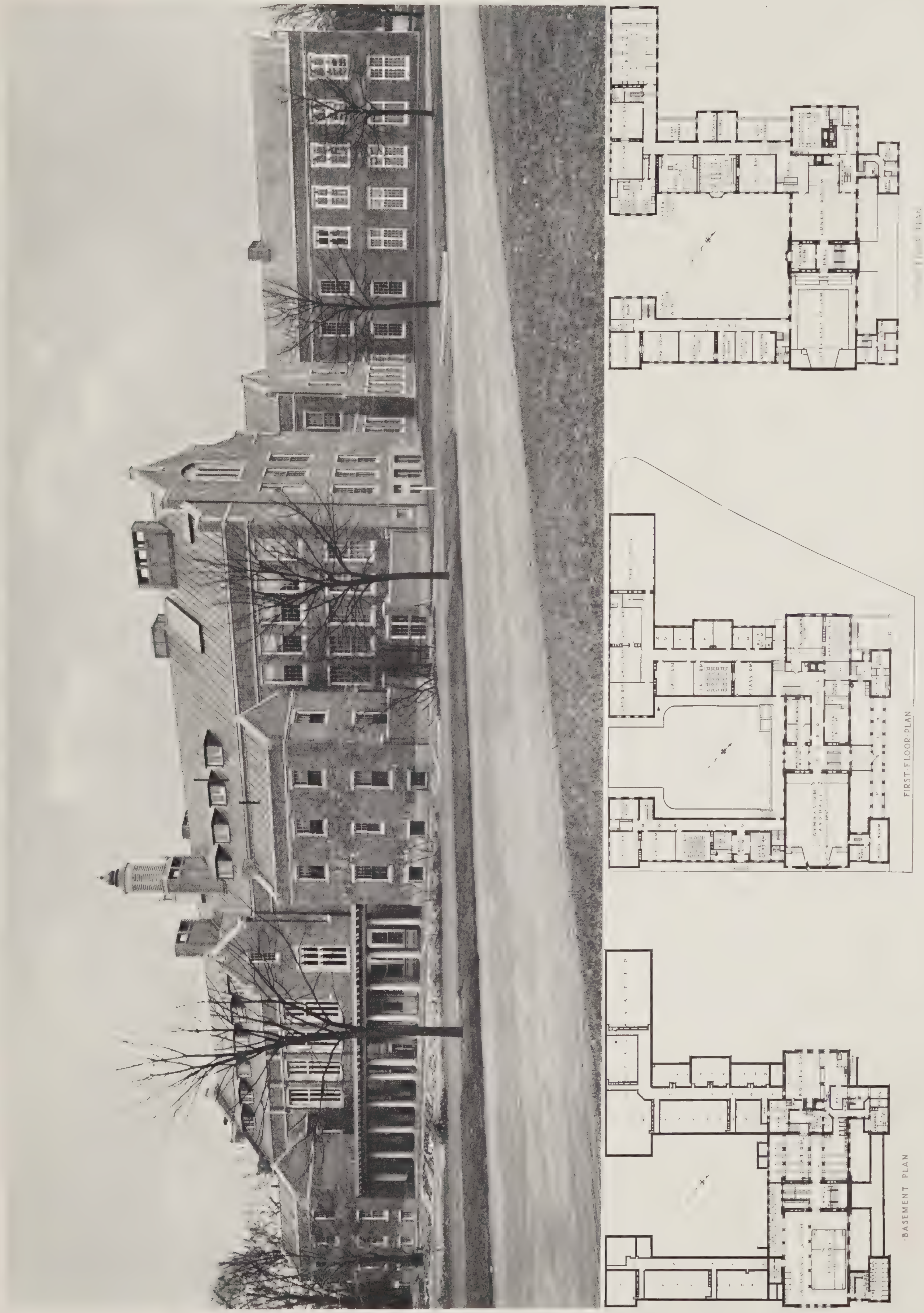
WINSOR SCHOOL, BROOKLINE, MASS.
R. CLIPSTON STURGIS, ARCHITECT.

WINSOR SCHOOL, BROOKLINE, MASS.
R. CLIPSTON STURGIS, ARCHITECT.



EXTERIOR DETAILS, WINSOR SCHOOL, BROOKLINE, MASS.

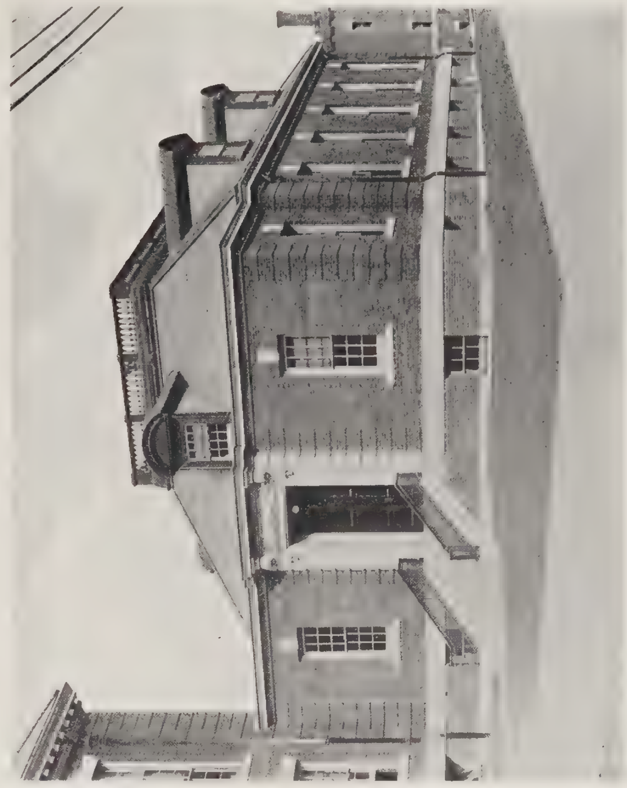
R. CLIPSTON STURGIS, ARCHITECT.

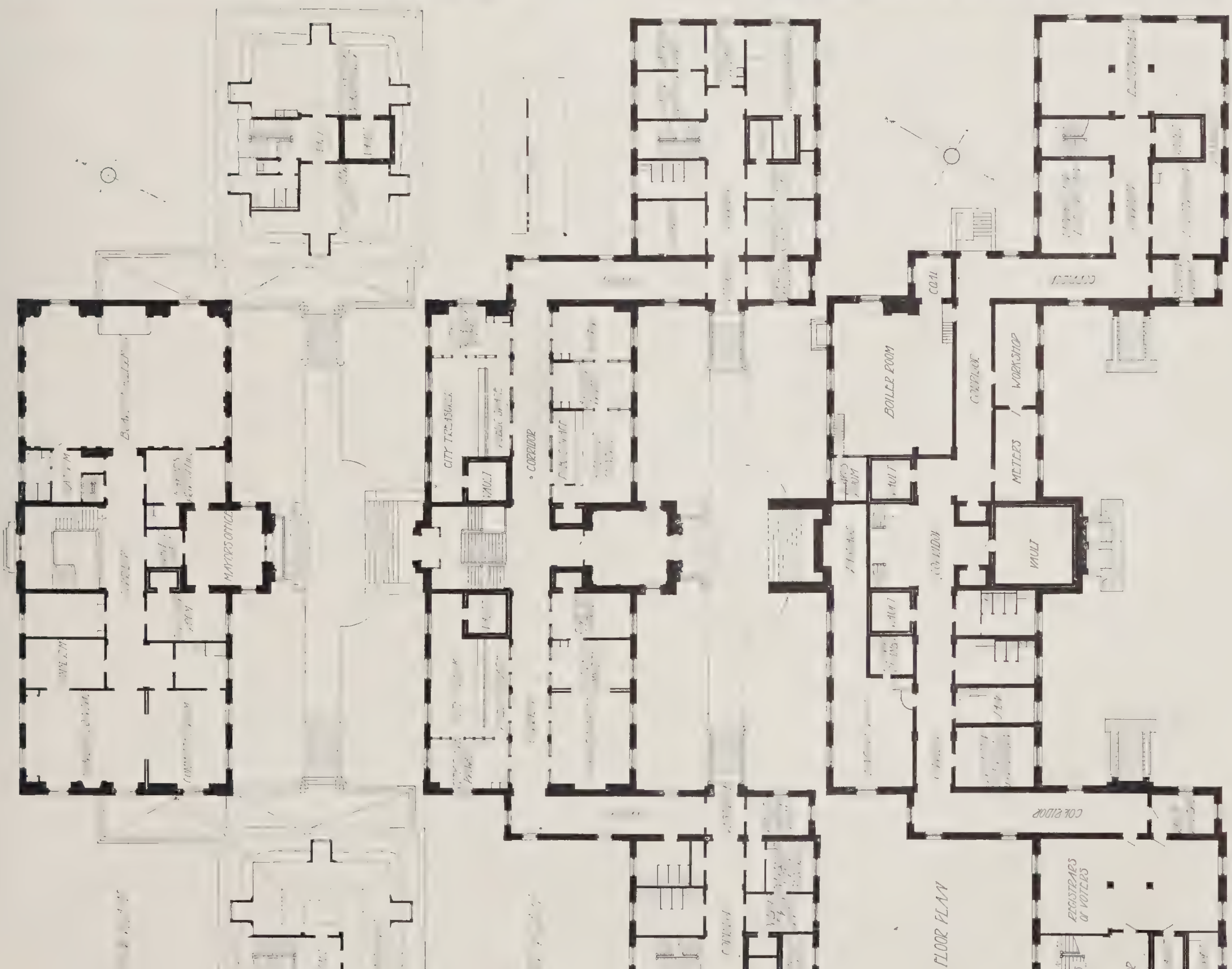


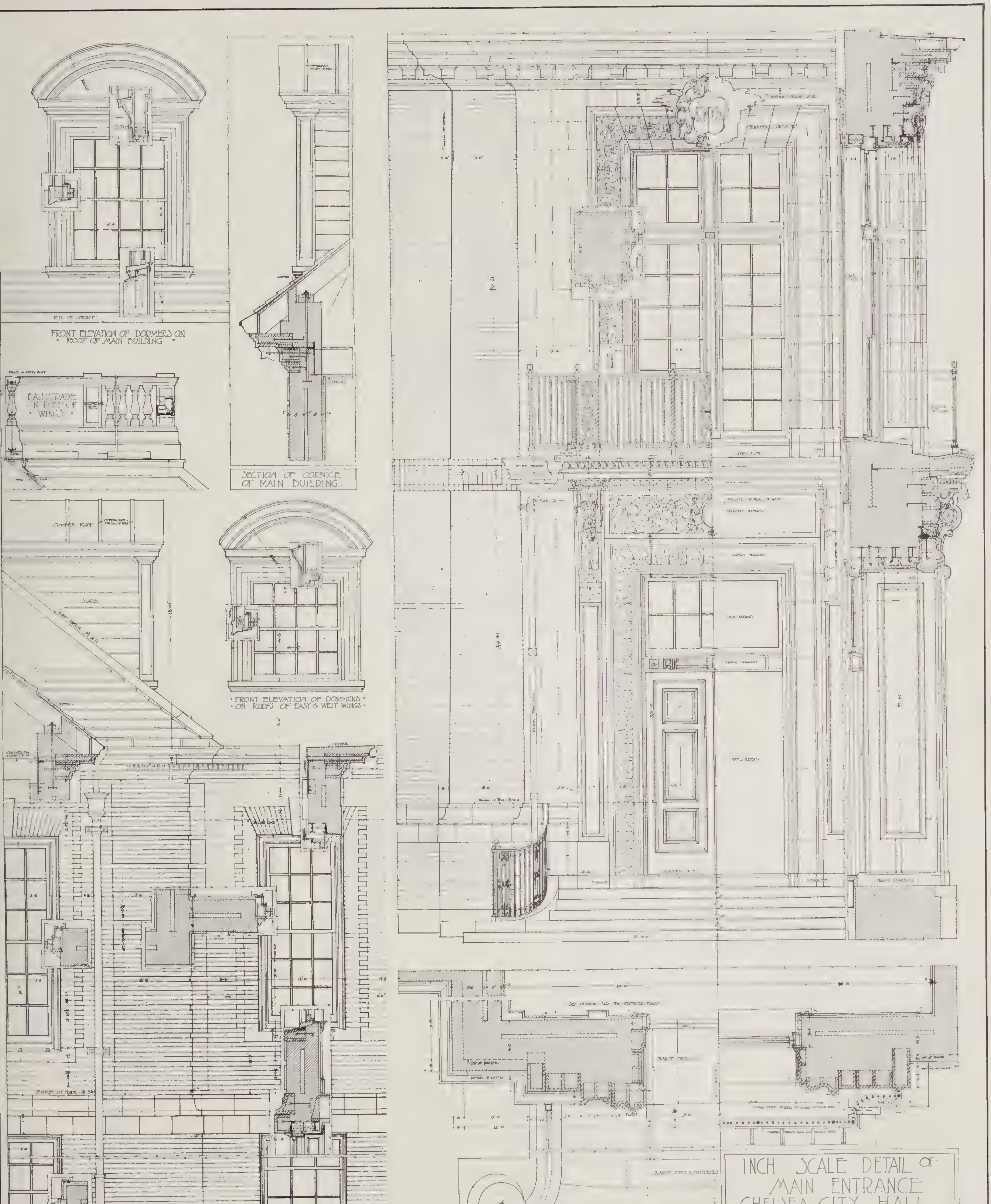
WINSOR SCHOOL, BROOKLINE, MASS.
R. CLIPSTON STURGIS, ARCHITECT.

CHELSEA CITY HALL, CHELSEA, MASS.
PEABODY & STEARNS, ARCHITECTS.

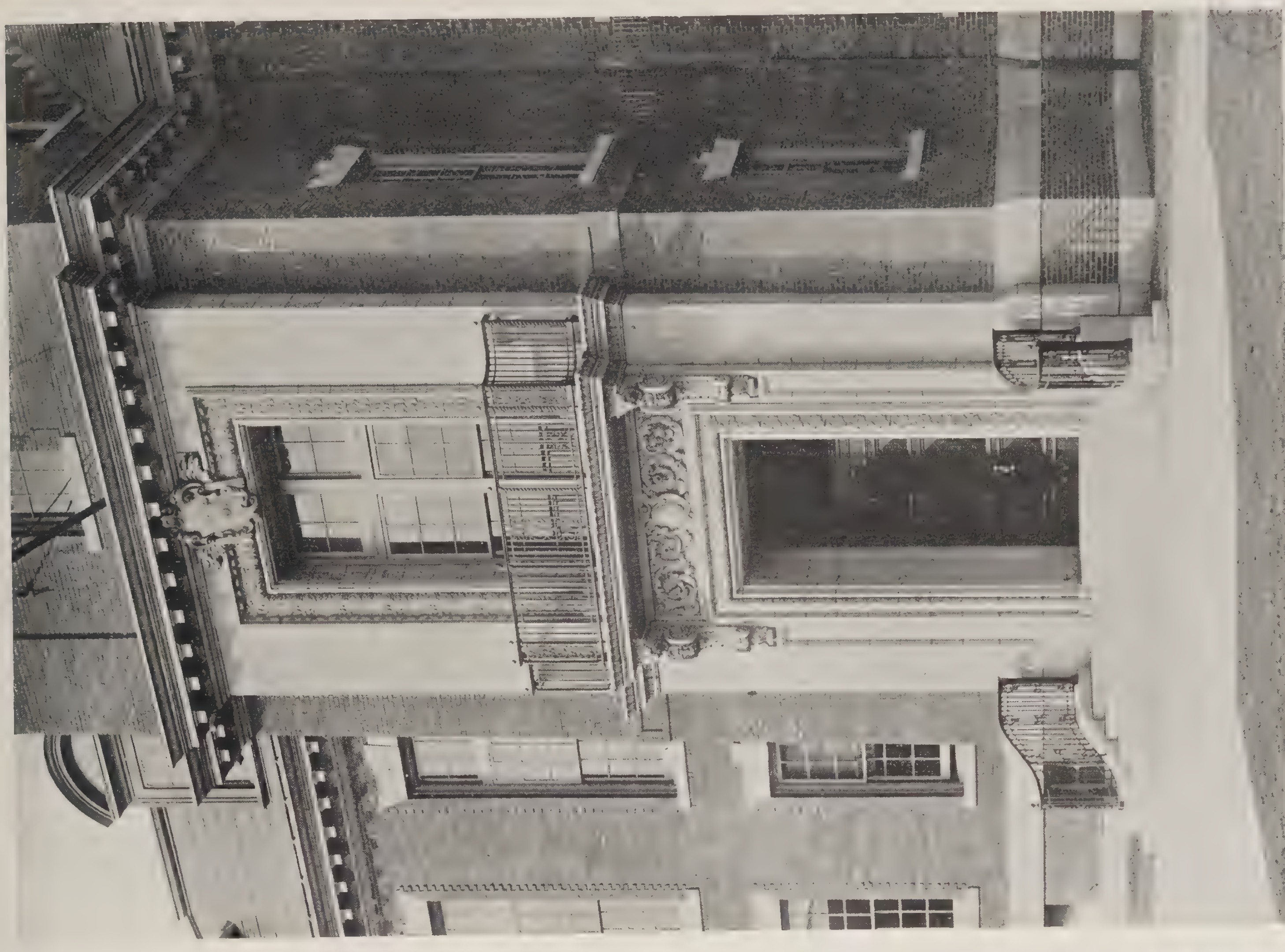
CHELSEA CITY HALL,
CHELSEA, MASS.
PEABODY & STEARNS, ARCHITECTS.

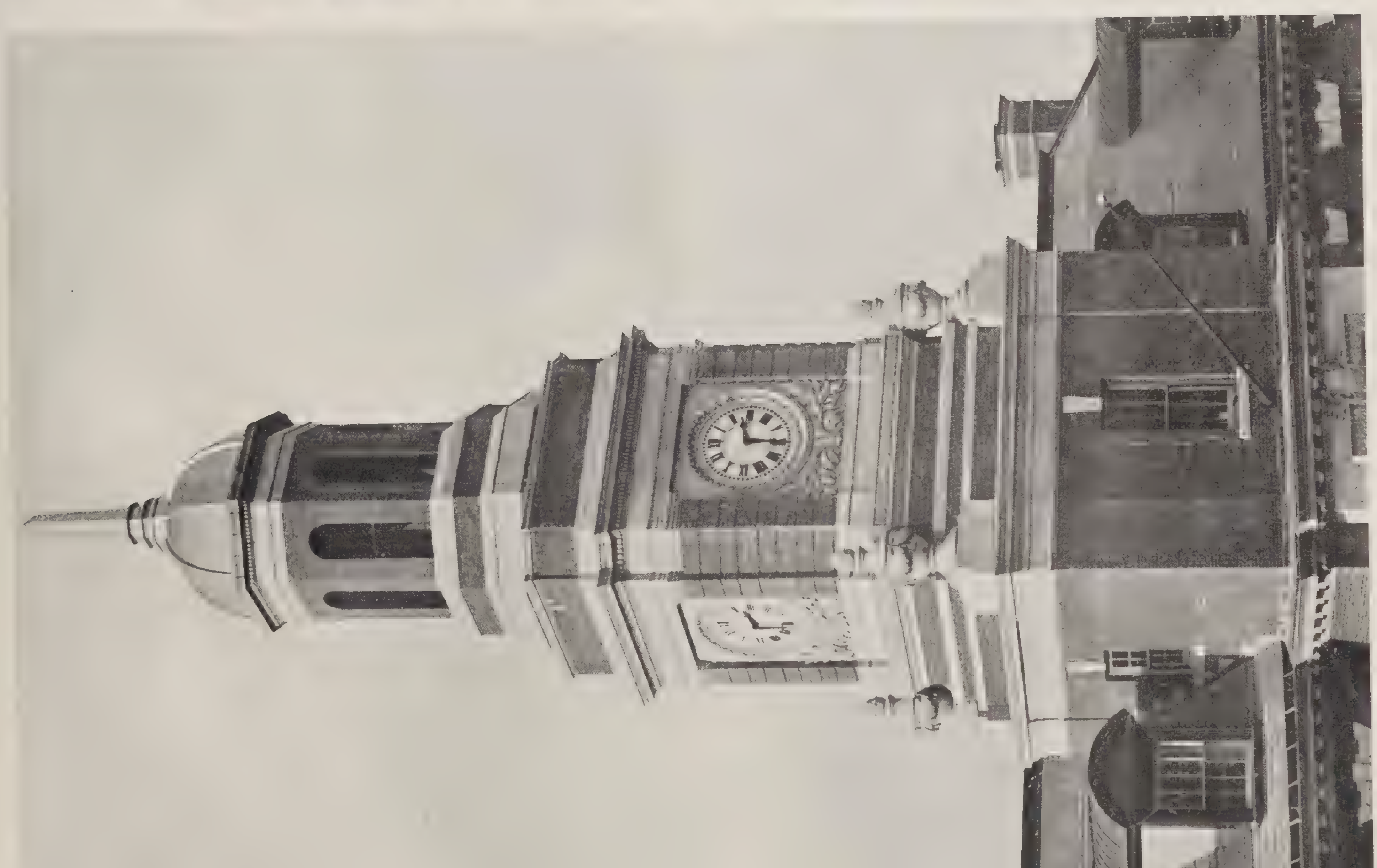






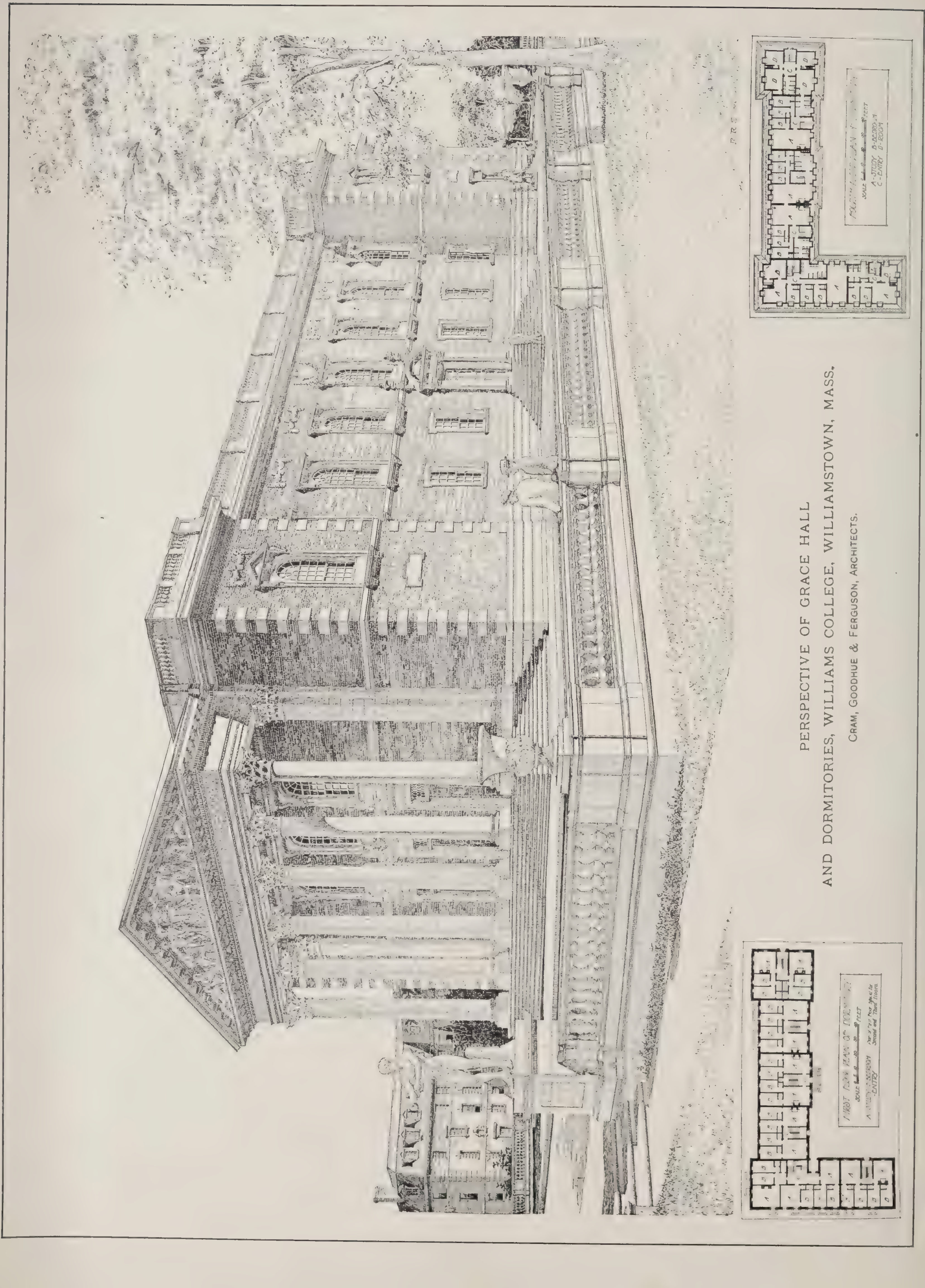
CHELSEA CITY HALL, CHELSEA, MASS.
PEABODY & STEARNS, ARCHITECTS.



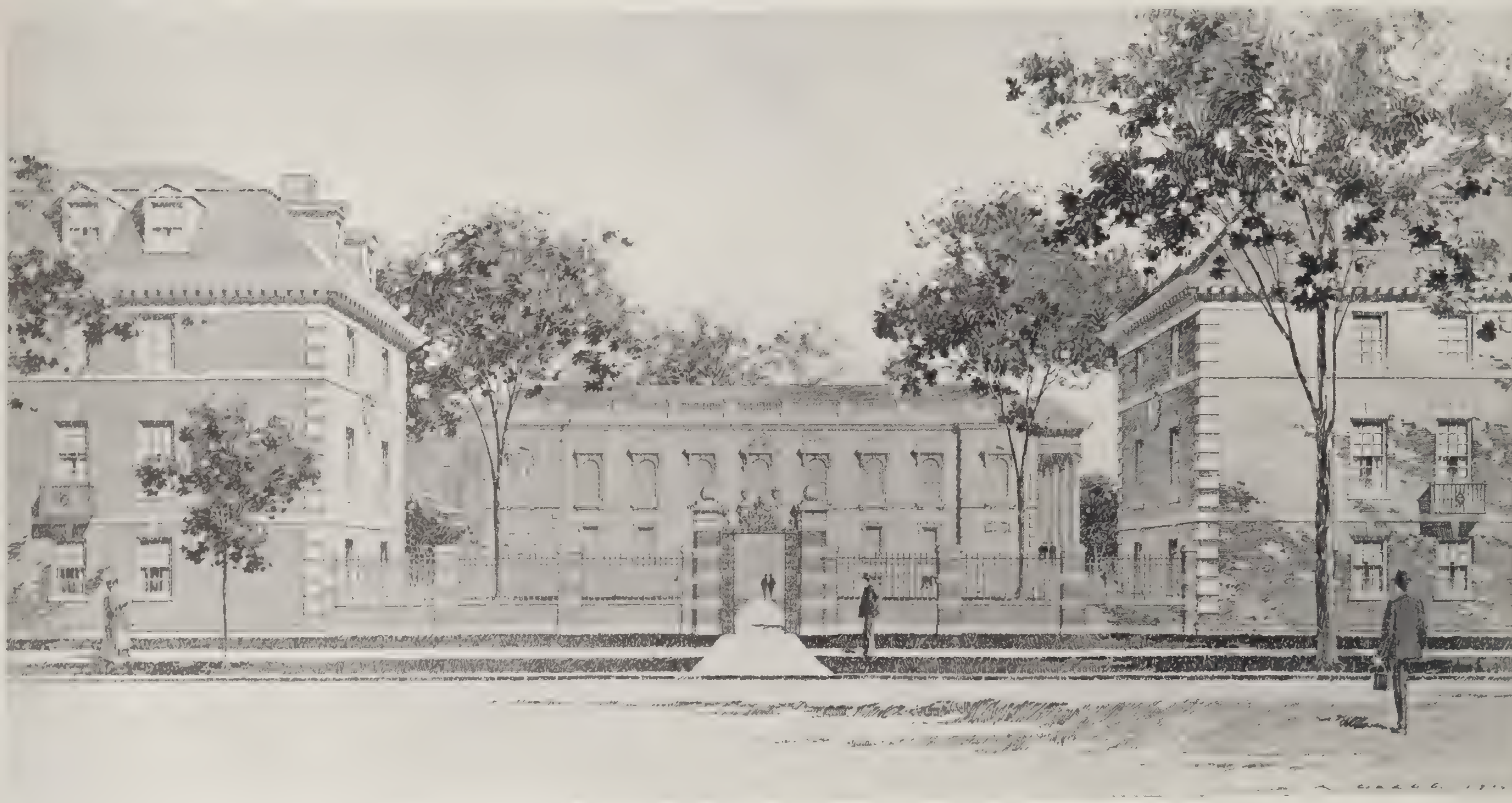


CHELSEA CITY HALL, CHELSEA, MASS.

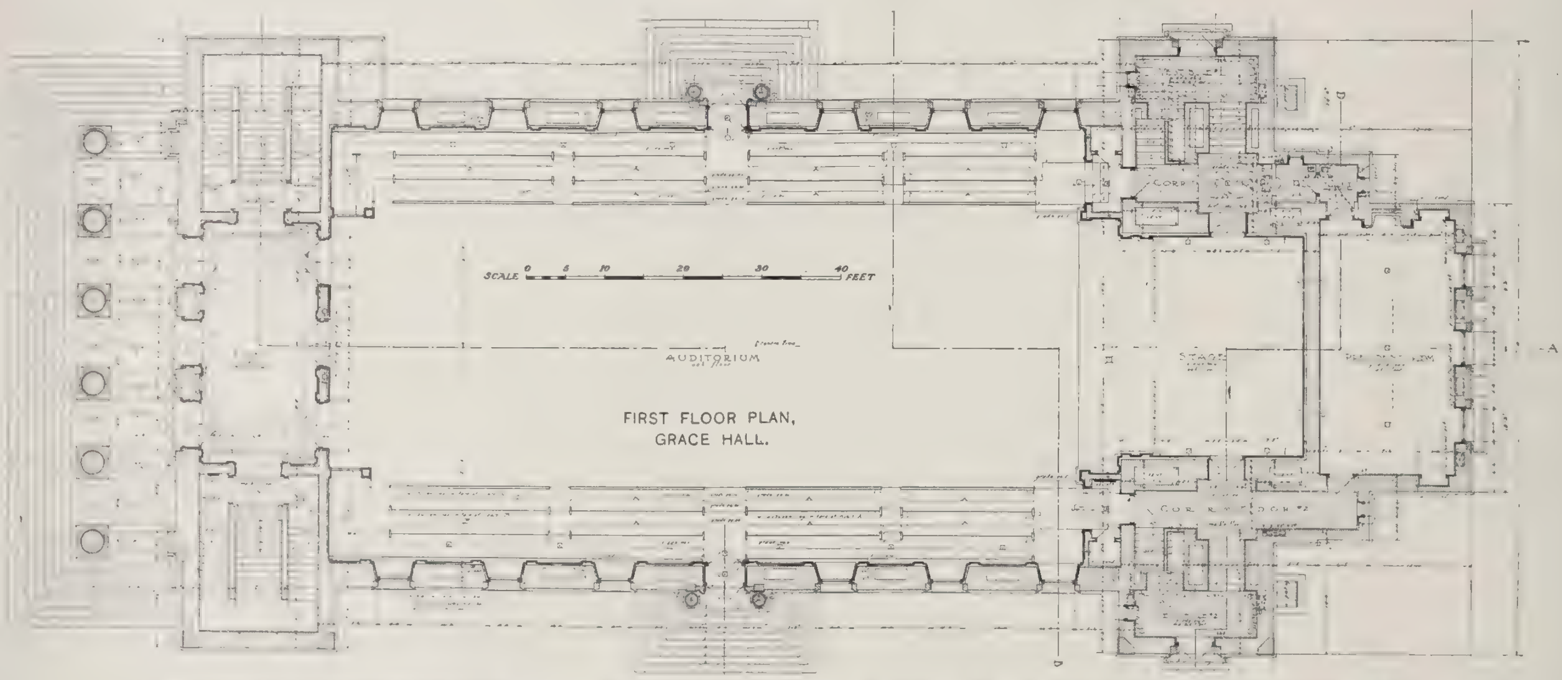
PEABODY & STEARNS, ARCHITECTS.



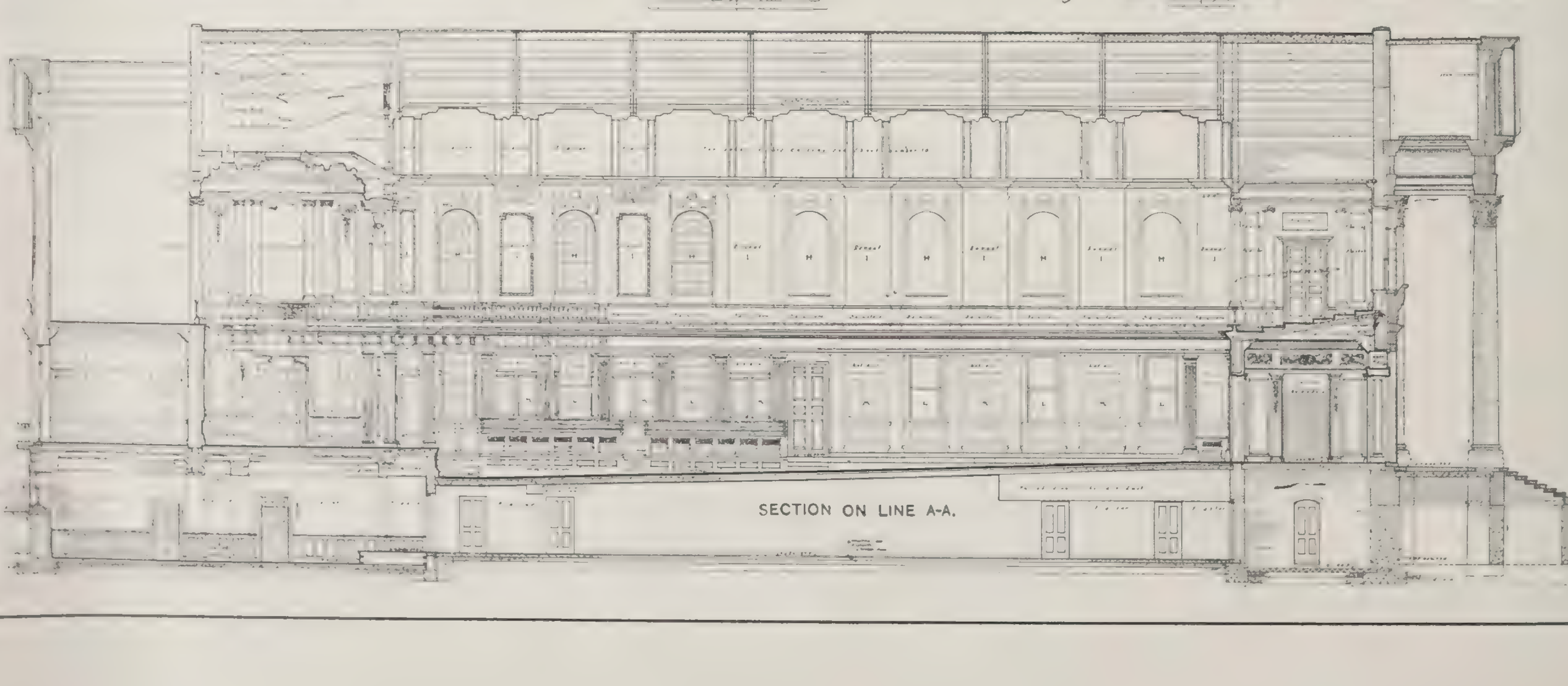
PERSPECTIVE OF GRACE HALL
AND DORMITORIES, WILLIAMS COLLEGE, WILLIAMSTOWN, MASS.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



PERSPECTIVE OF GRACE HALL AND DORMITORIES, WILLIAMS COLLEGE, WILLIAMSTOWN, MASS.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



FIRST FLOOR PLAN,
GRACE HALL.

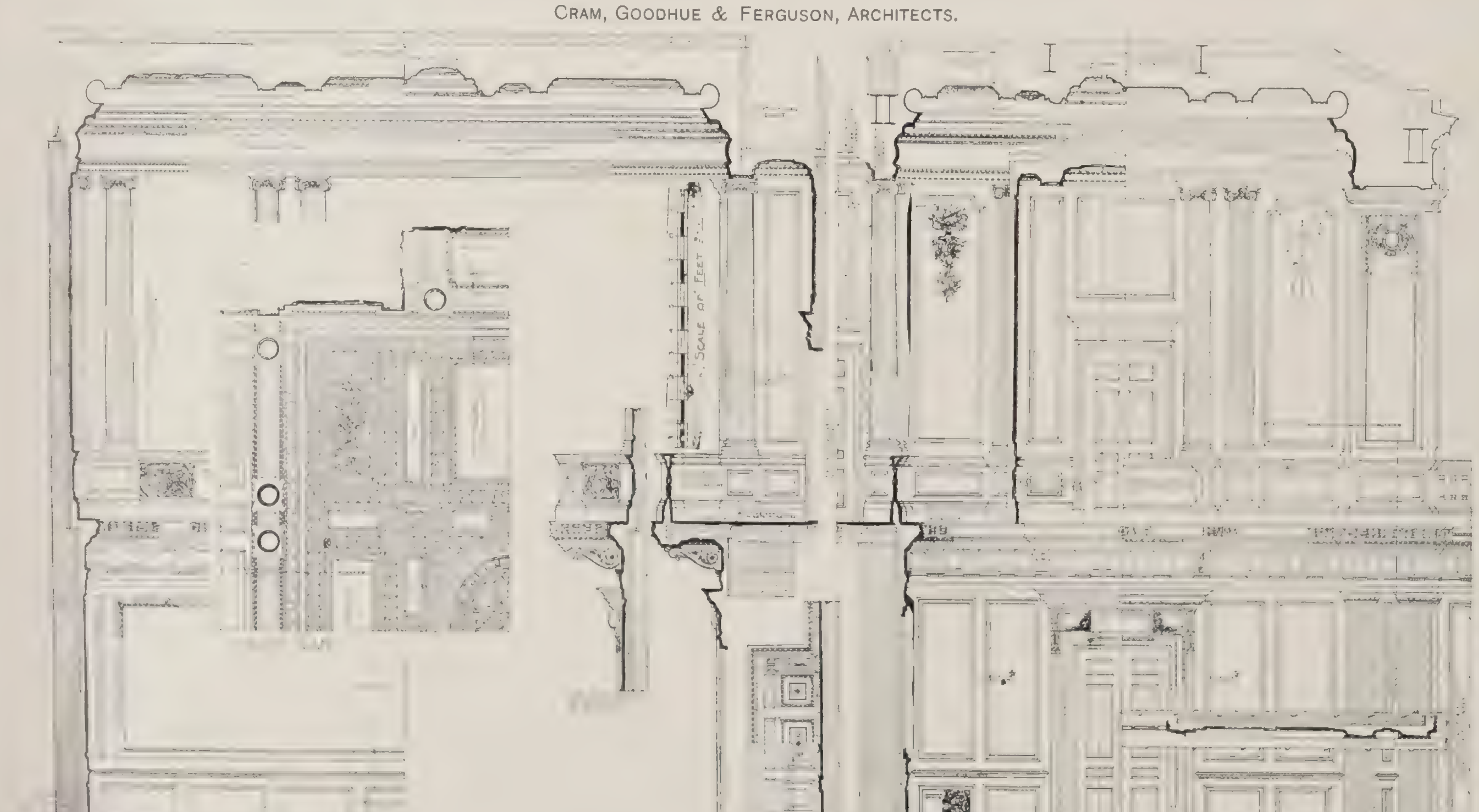


SECTION ON LINE A-A.

PERSPECTIVE OF QUADRANGLE,

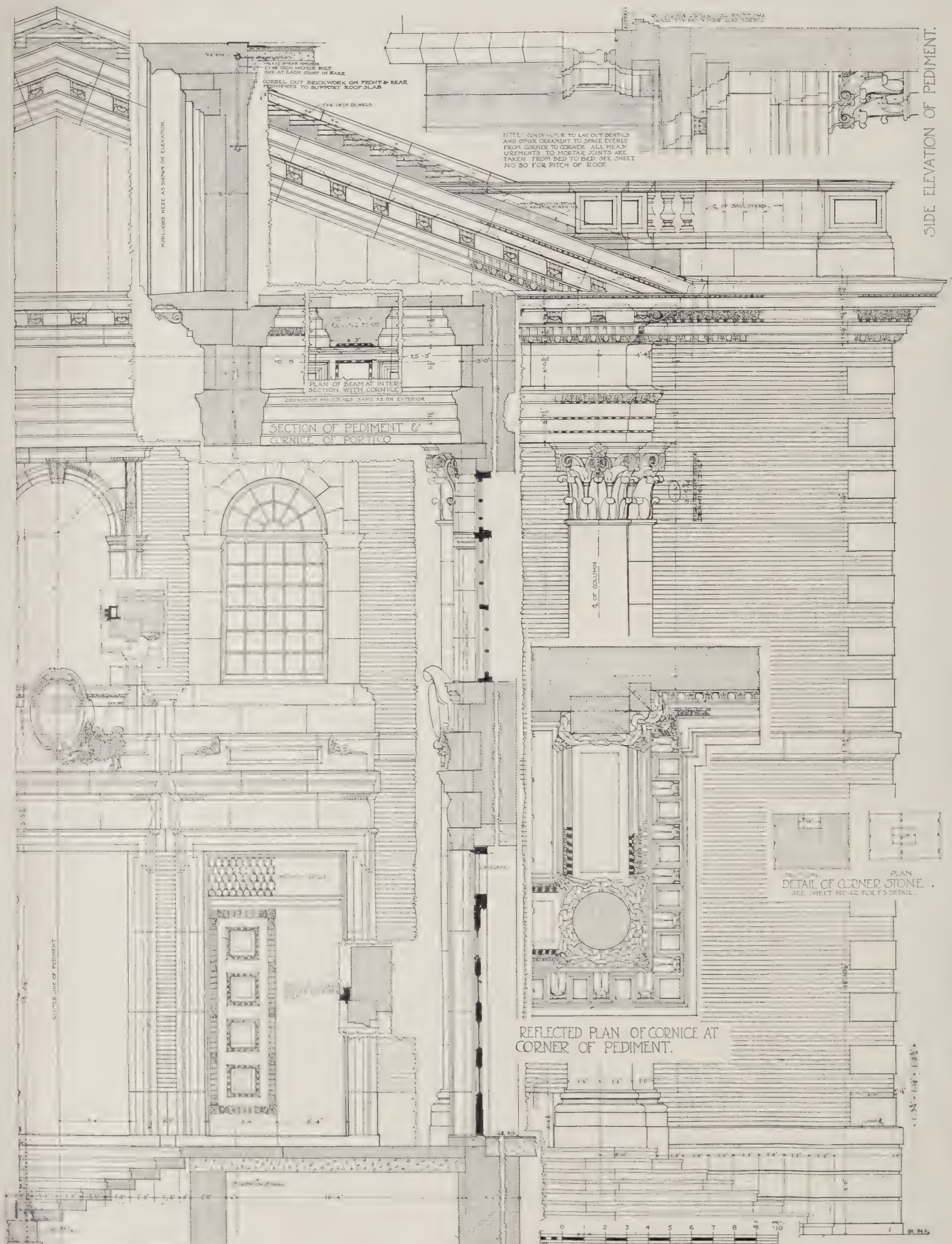
GRACE HALL AND DORMITORIES, WILLIAMS COLLEGE, WILLIAMSTOWN, MASS.

CRAM, GOODHUE & FERGUSON, ARCHITECTS.



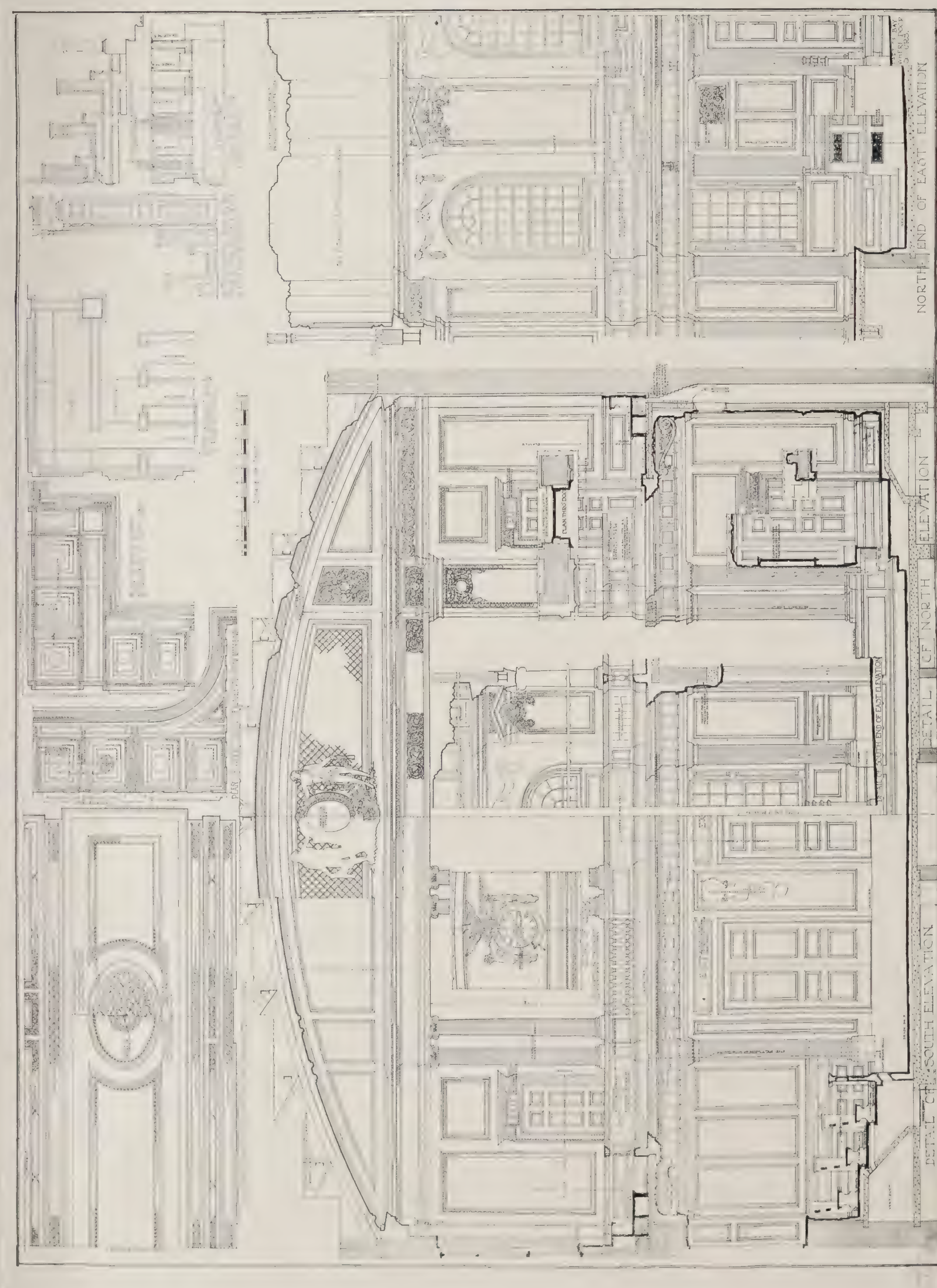
DETAILS OF STAGE,

GRACE HALL



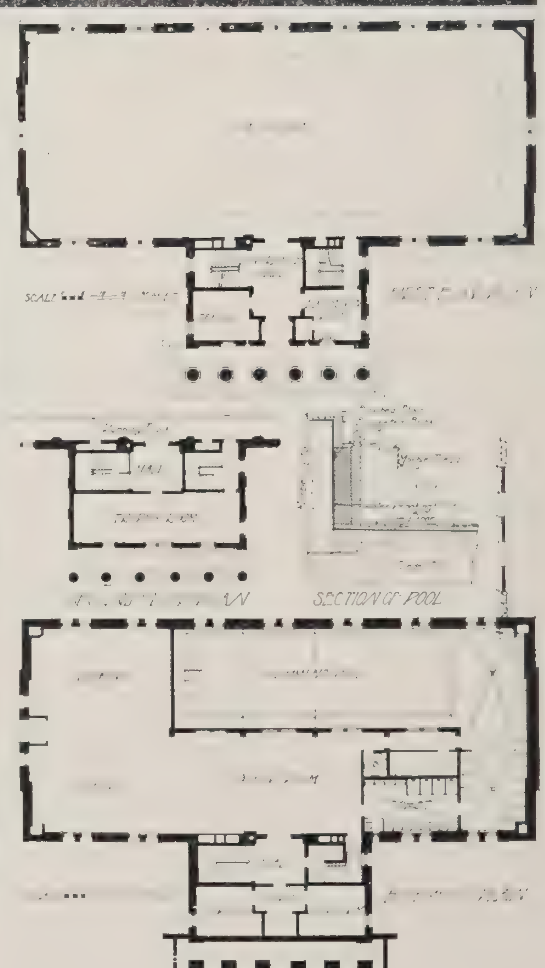
EXTERIOR DETAILS OF SOUTH ELEVATION, GRACE HALL, WILLIAMS COLLEGE, WILLIAMSTOWN, MASS.

CRAM, GOODHUE & FERGUSON, ARCHITECTS.

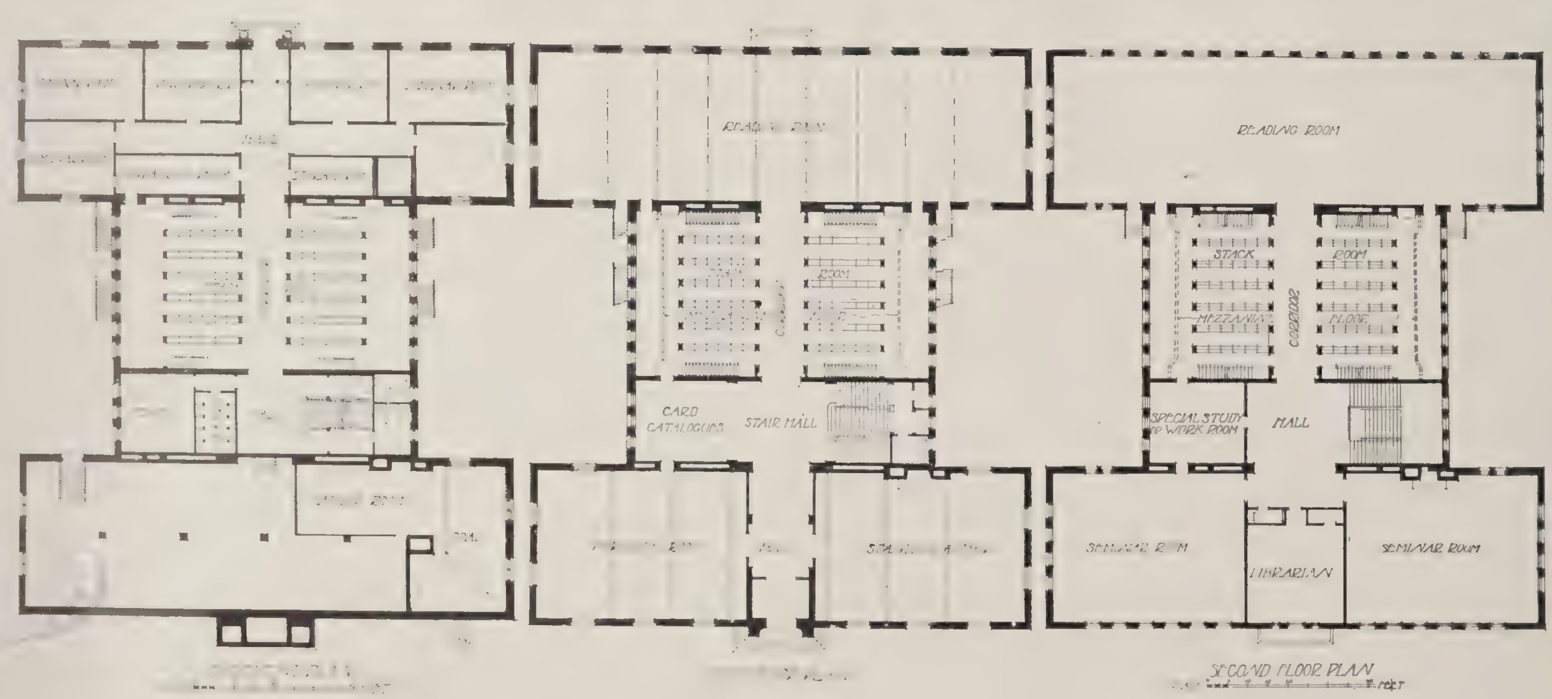


DETAILS OF AUDITORIUM, GRACE HALL, WILLIAMS COLLEGE, WILLIAMSTOWN, MASS.

CRAM, GOODHUE & FERGUSON, ARCHITECTS.

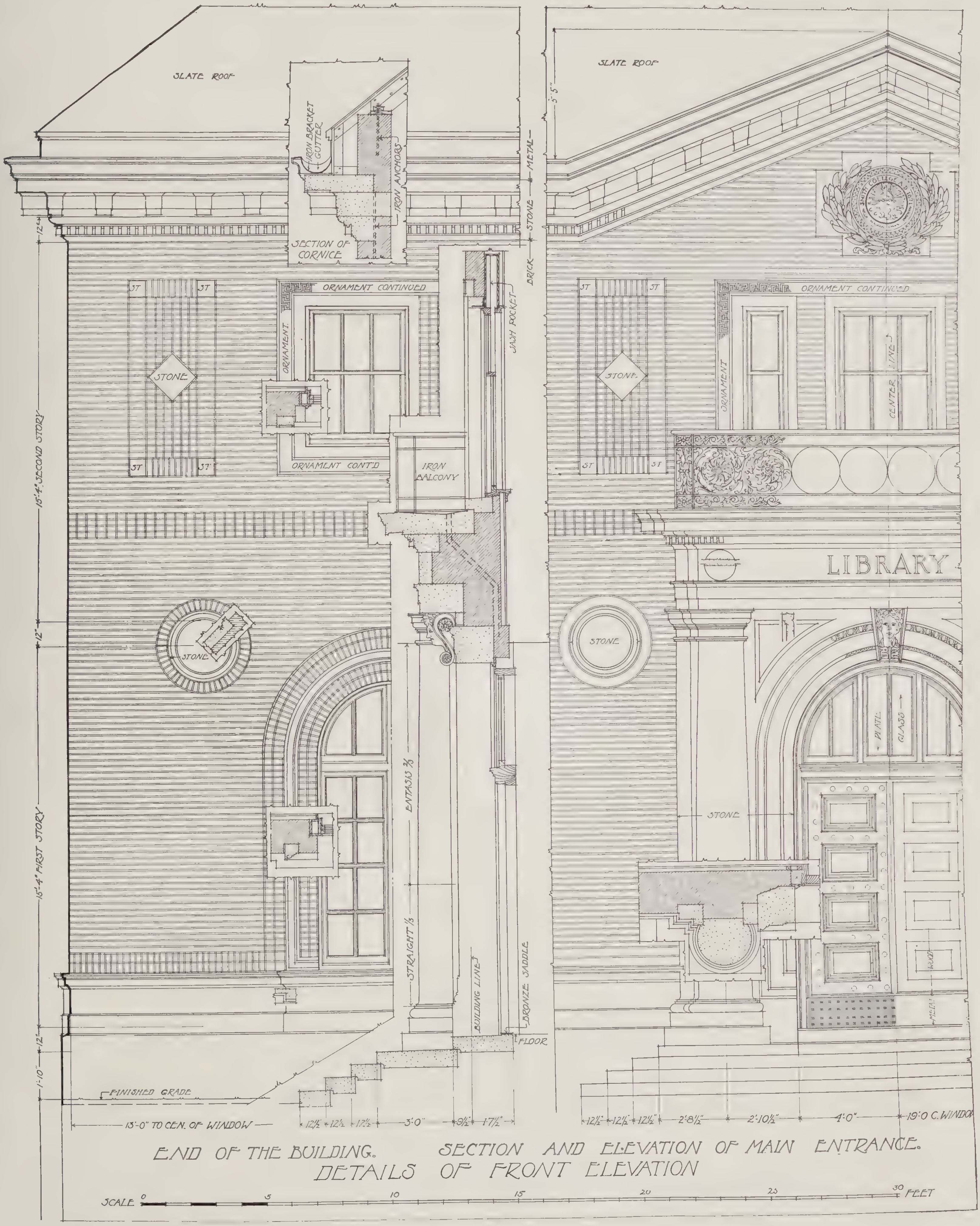


GYMNASIUM, MT. HERMON SCHOOL FOR BOYS, MT. HERMON, MASS.
PARISH & SCHROEDER, ARCHITECTS.



LIBRARY, SMITH COLLEGE, NORTHAMPTON, MASS.
LORD & HEWLETT, ARCHITECTS.

LIBRARY, SMITH COLLEGE, NORTHAMPTON, MASS.
LORD & HEWLETT, ARCHITECTS.



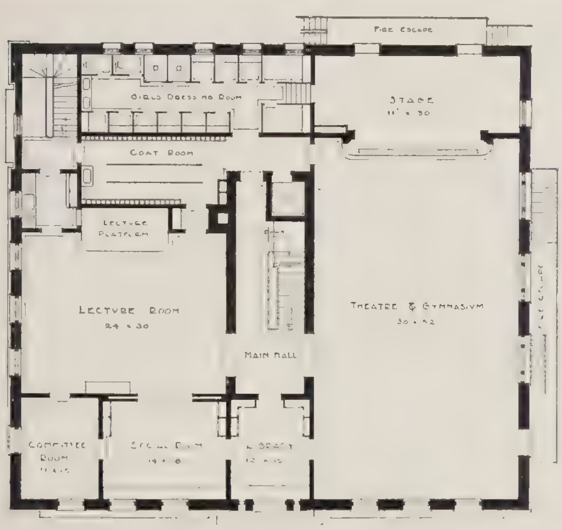
LIBRARY, SMITH COLLEGE, NORTHAMPTON, MASS.
LORD & HEWLETT, ARCHITECTS.

WOMEN'S UNION, FALL RIVER, MASS.
PARKER MORSE HOOPER, ARCHITECT.

VOL. 20, NO. 2. PLATE 25.

EAST ENTRANCE.

MAIN ENTRANCE.

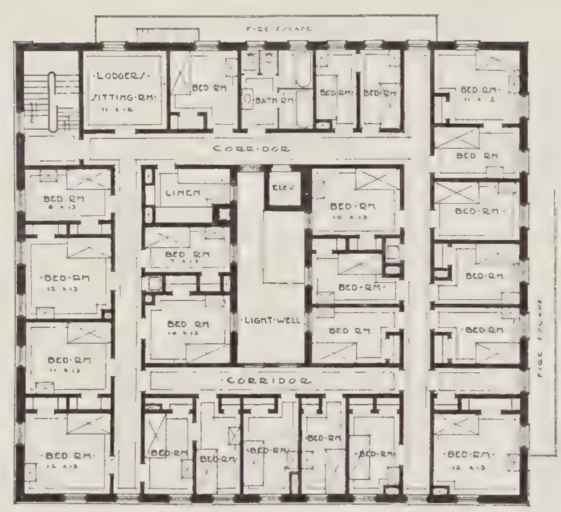


SECOND FLOOR PLAN.

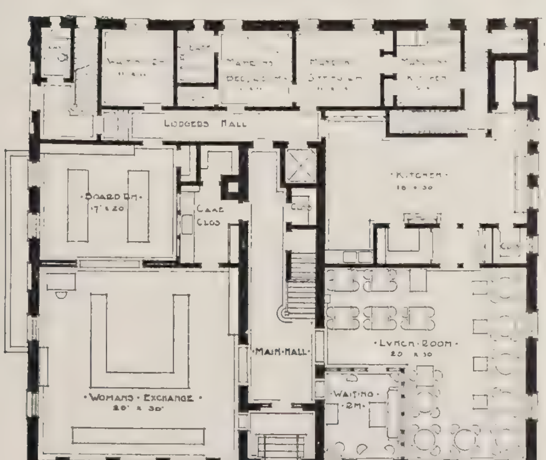
WOMEN'S UNION,

FALL RIVER.

MASS.



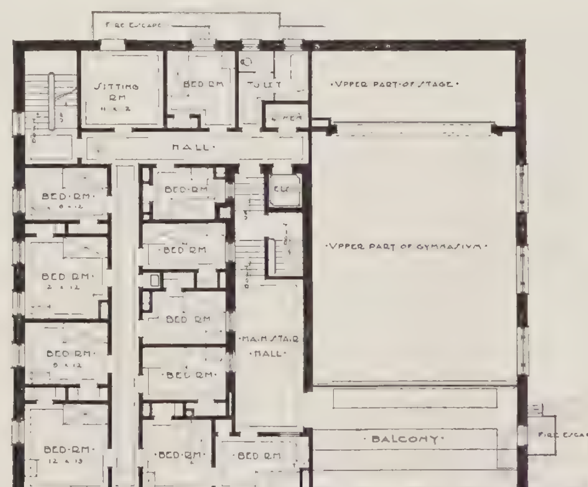
FOURTH FLOOR PLAN



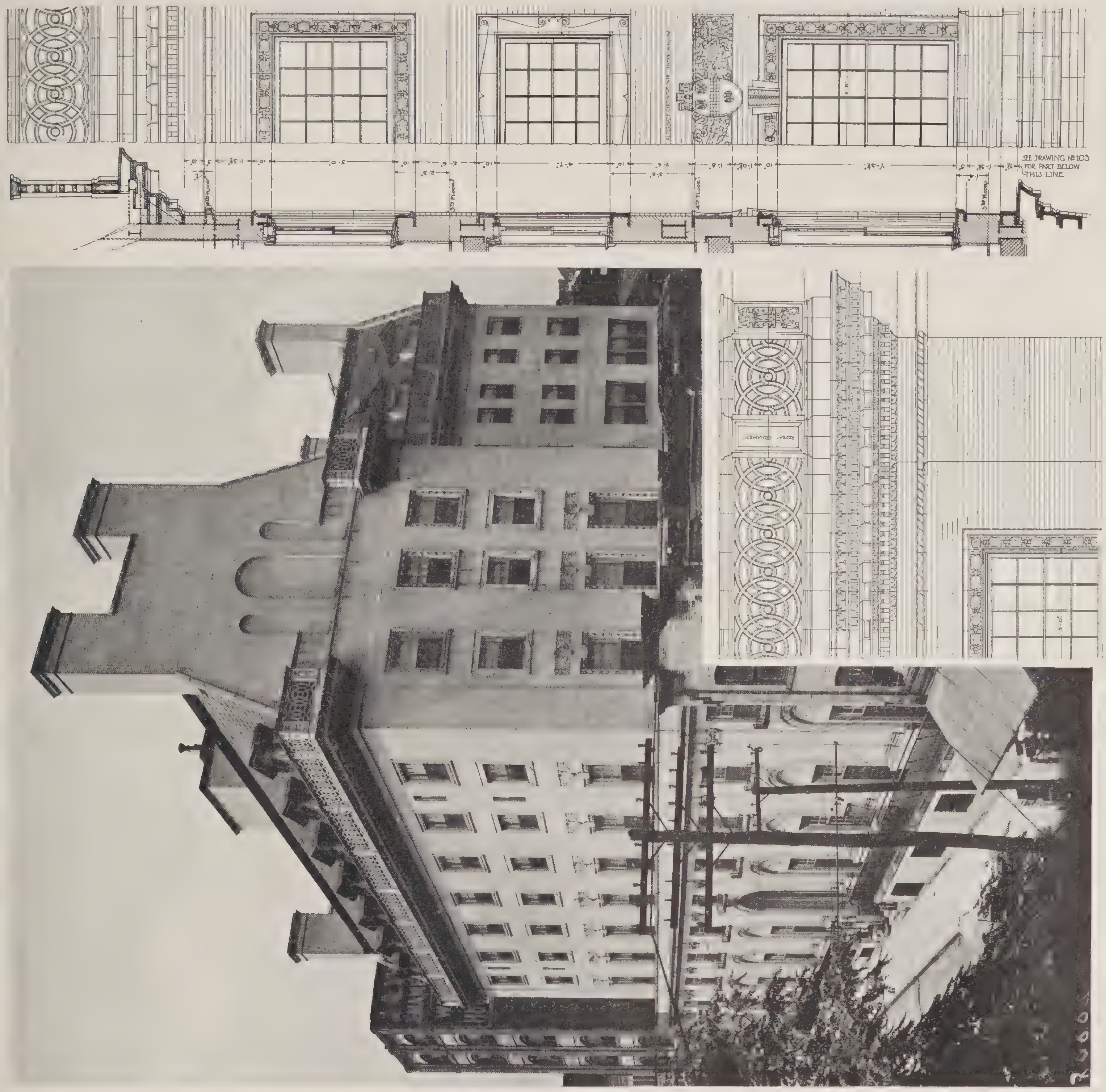
FIRST FLOOR PLAN.

PARKER MORSE HOOPER,

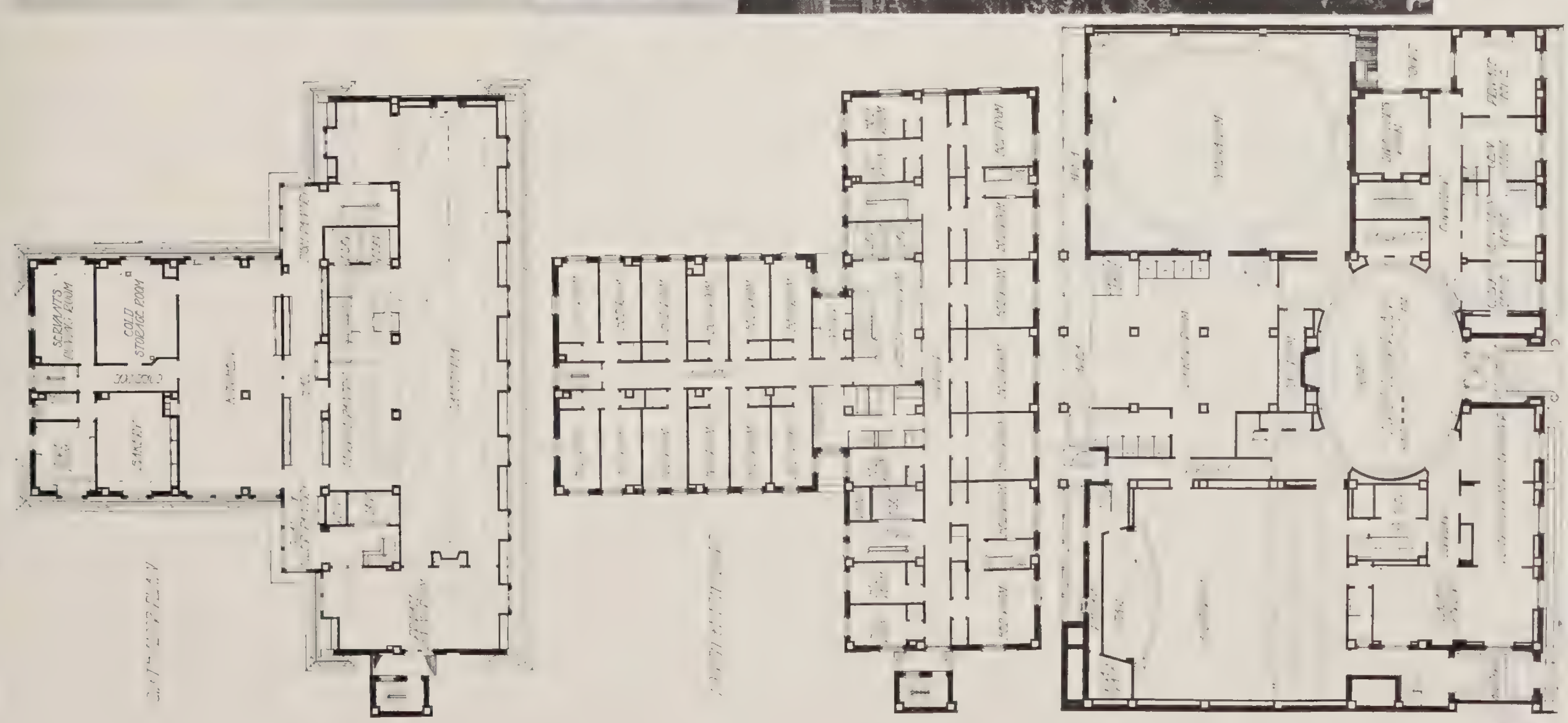
ARCHITECT.



THIRD FLOOR PLAN.

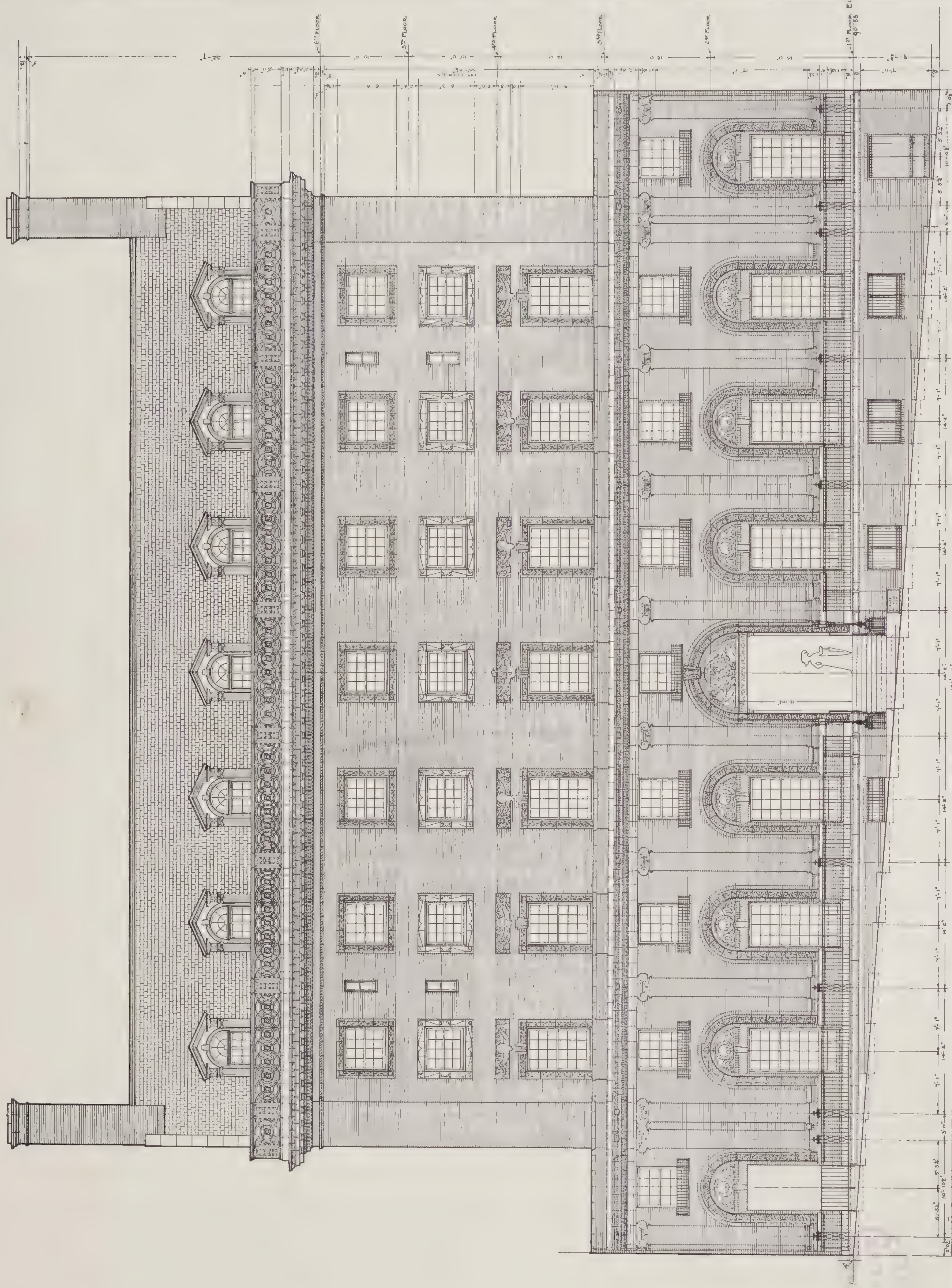


EXTERIOR DETAIL.



CENTRAL YOUNG WOMEN'S CHRISTIAN ASSOCIATION, PITTSBURG, PA.

JANSSEN & ABBOTT, ARCHITECTS.



FRONT ELEVATION.

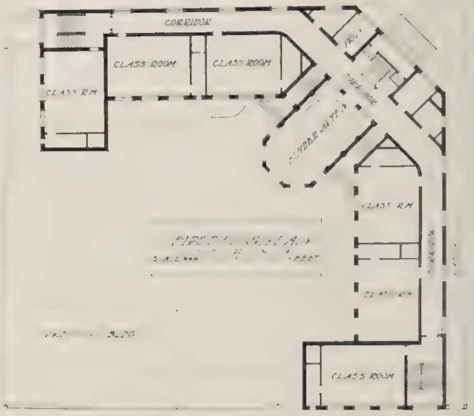
CENTRAL YOUNG WOMEN'S CHRISTIAN ASSOCIATION, PITTSBURG, PA.

JANSSEN & ABBOTT ARCHITECTS.

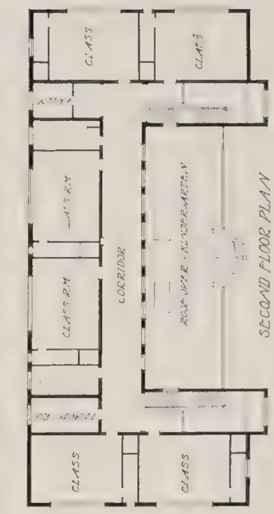
SECOND FLOOR PLAN

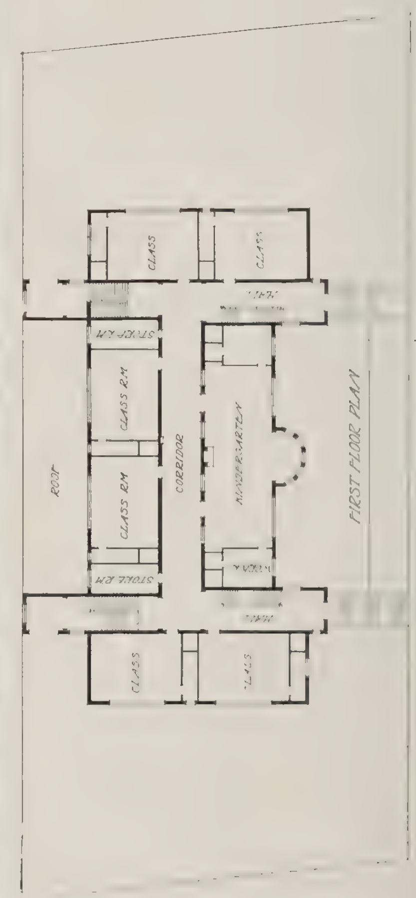
SHERMAN MEMORIAL DISPENSARY,
ST. JOHN'S RIVERSIDE HOSPITAL.
YONKERS, N. Y.
G. HOWARD CHAMBERLIN, ARCHITECT.

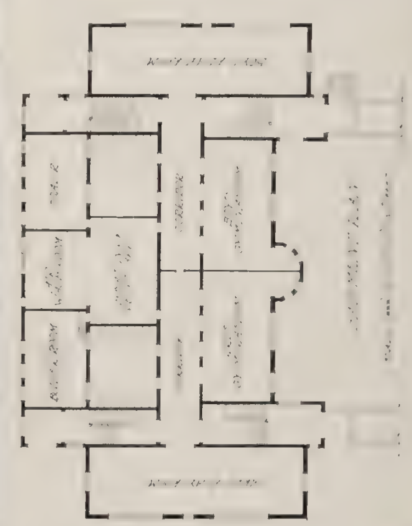
FIRST FLOOR PLAN



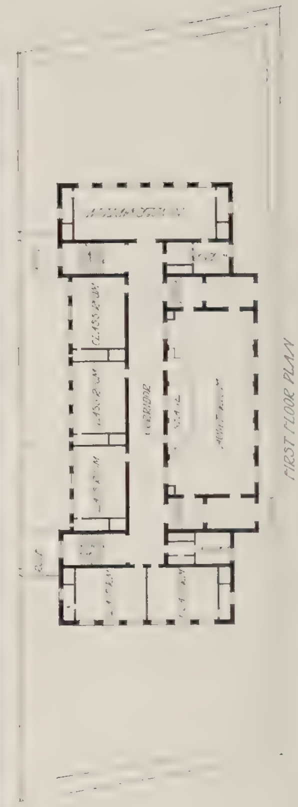
NEW CARR SCHOOL, ST. LOUIS, MO.
WILLIAM B. ITTNER, ARCHITECT.

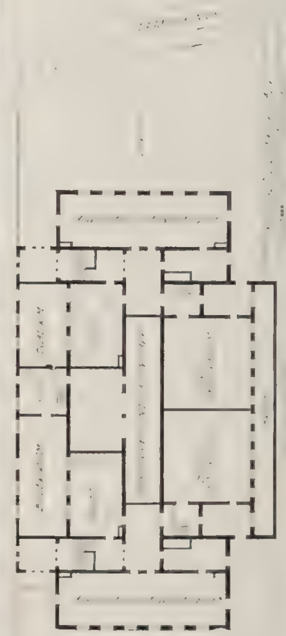




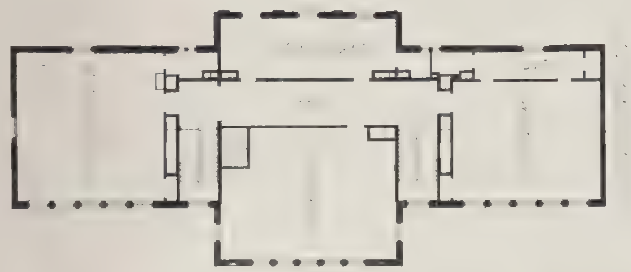


NEW LYON SCHOOL, ST. LOUIS, MO.
WILLIAM B. ITTNER, ARCHITECT.

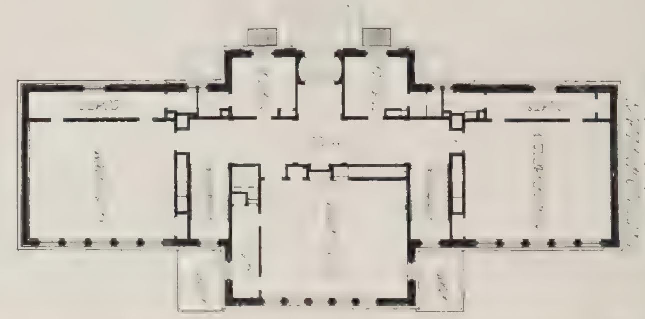




NEW HUMBOLDT SCHOOL,
ST. LOUIS, MO.
WILLIAM B. ITTNER,
ARCHITECT.

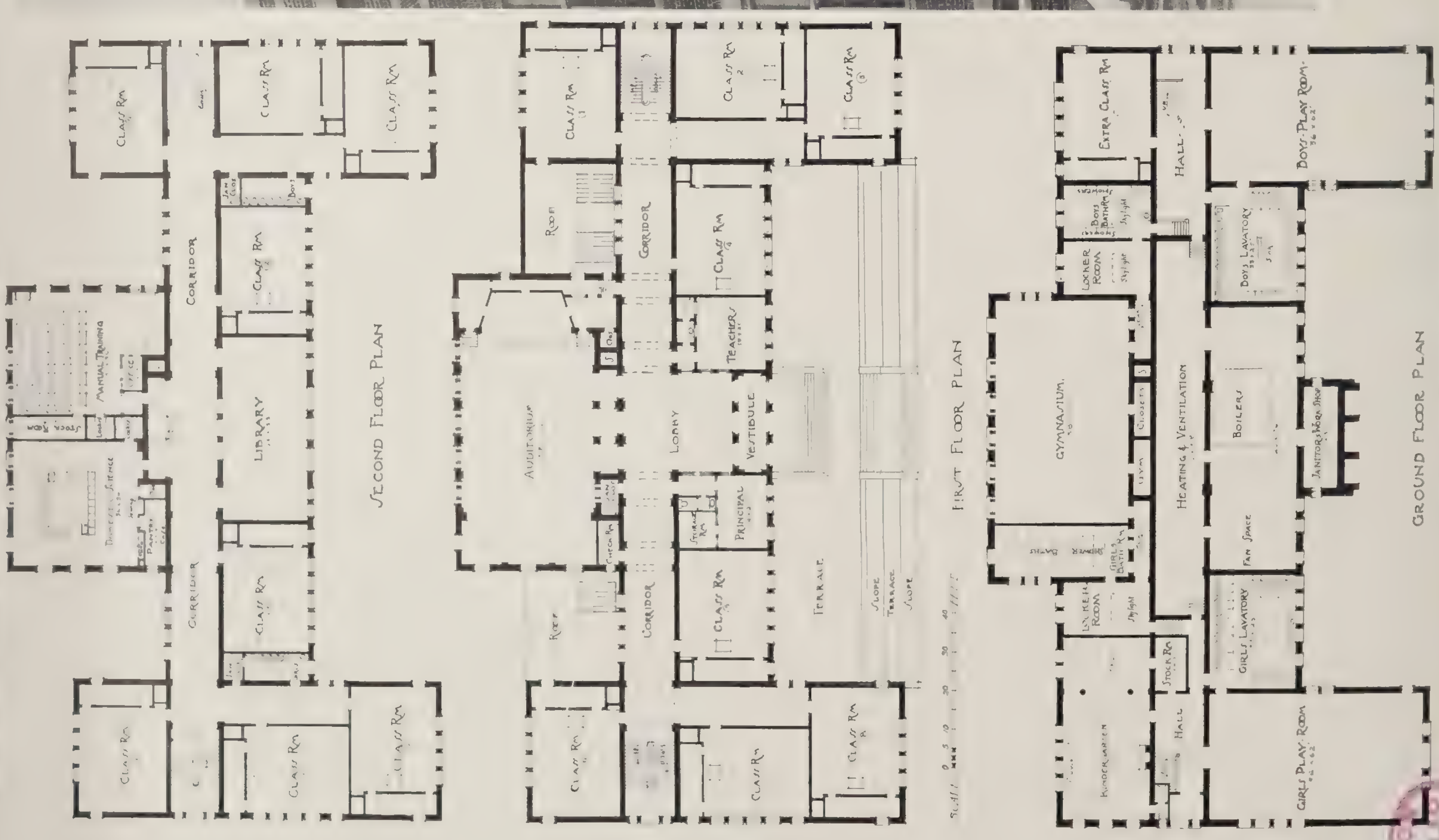


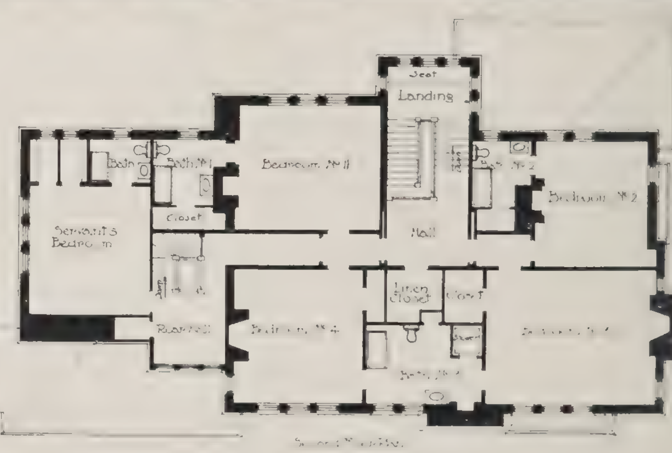
LINCOLN SCHOOL,
LINCOLN, MASS.
PARKER, THOMAS & RICE,
ARCHITECTS.



WESTWOOD SCHOOL, CINCINNATI, OHIO.
GARBER & WOODWARD, ARCHITECTS.

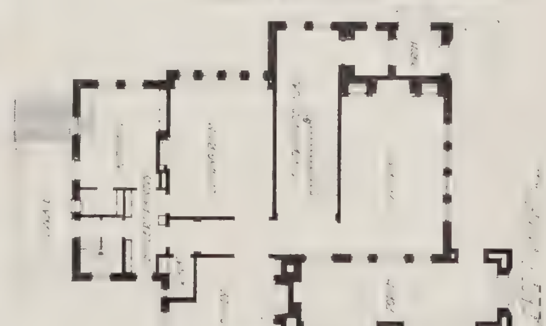
MAIN ENTRANCE, WESTWOOD SCHOOL, CINCINNATI, OHIO.
GARBER & WOODWARD, ARCHITECTS.





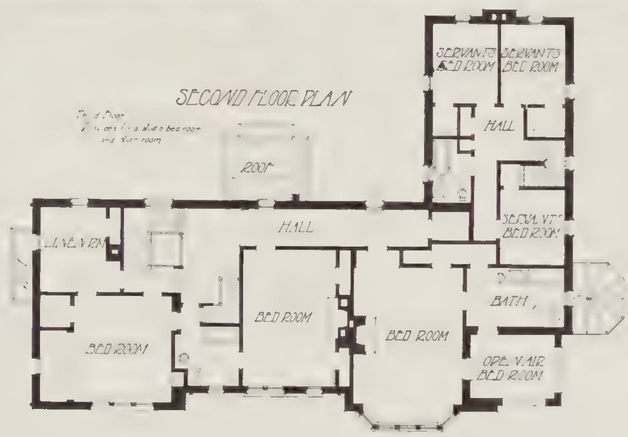
HOUSE AT PITTSBURG, PA.

JANSSEN & ABBOTT, ARCHITECTS.



HOUSE AT PITTSBURG, PA.
JANSSEN & ABBOTT, ARCHITECTS.

CONSERVATORY.



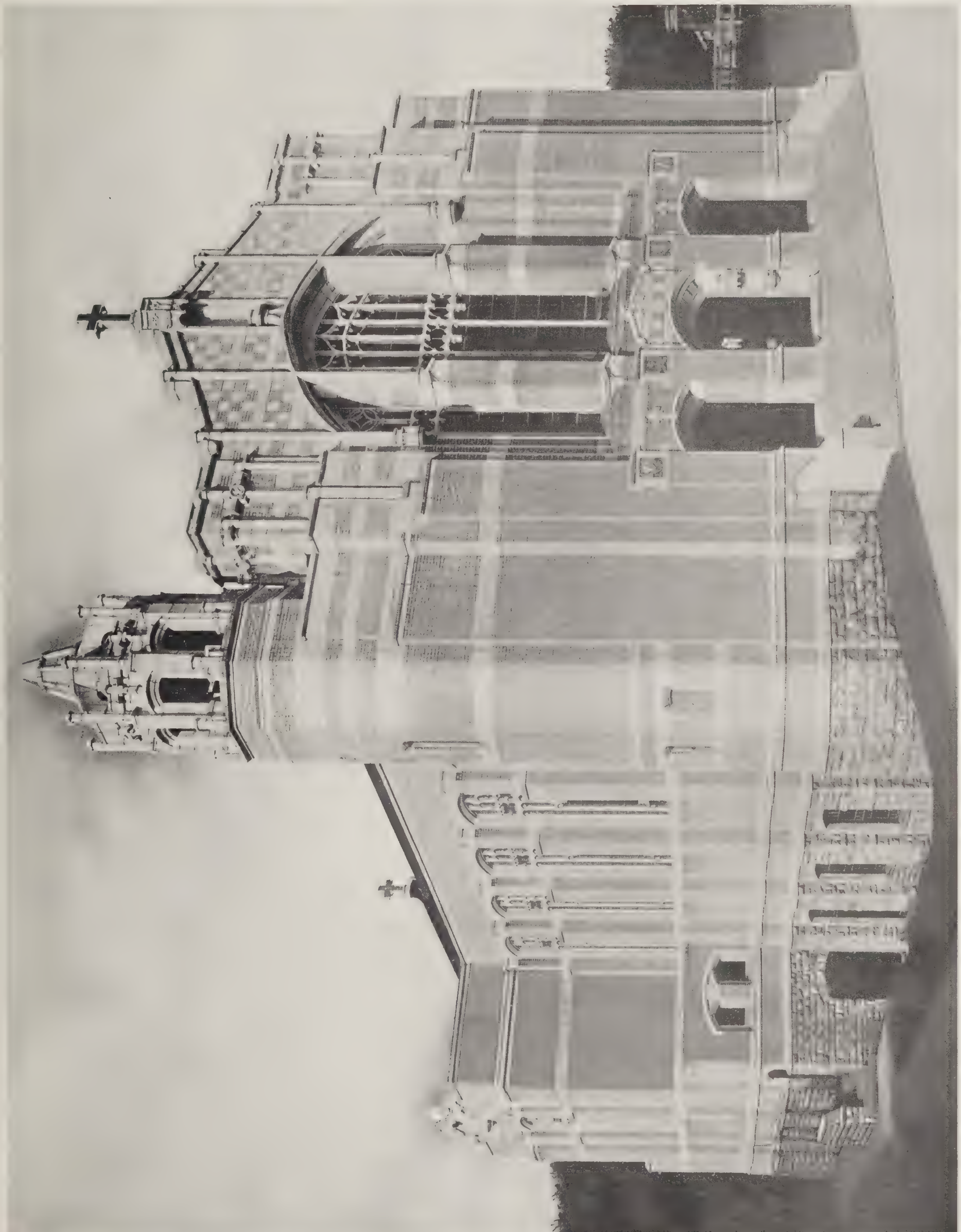
HOUSE AT WATERBURY, CONN.

CRAM, GOODHUE & FERGUSON,
ARCHITECTS.

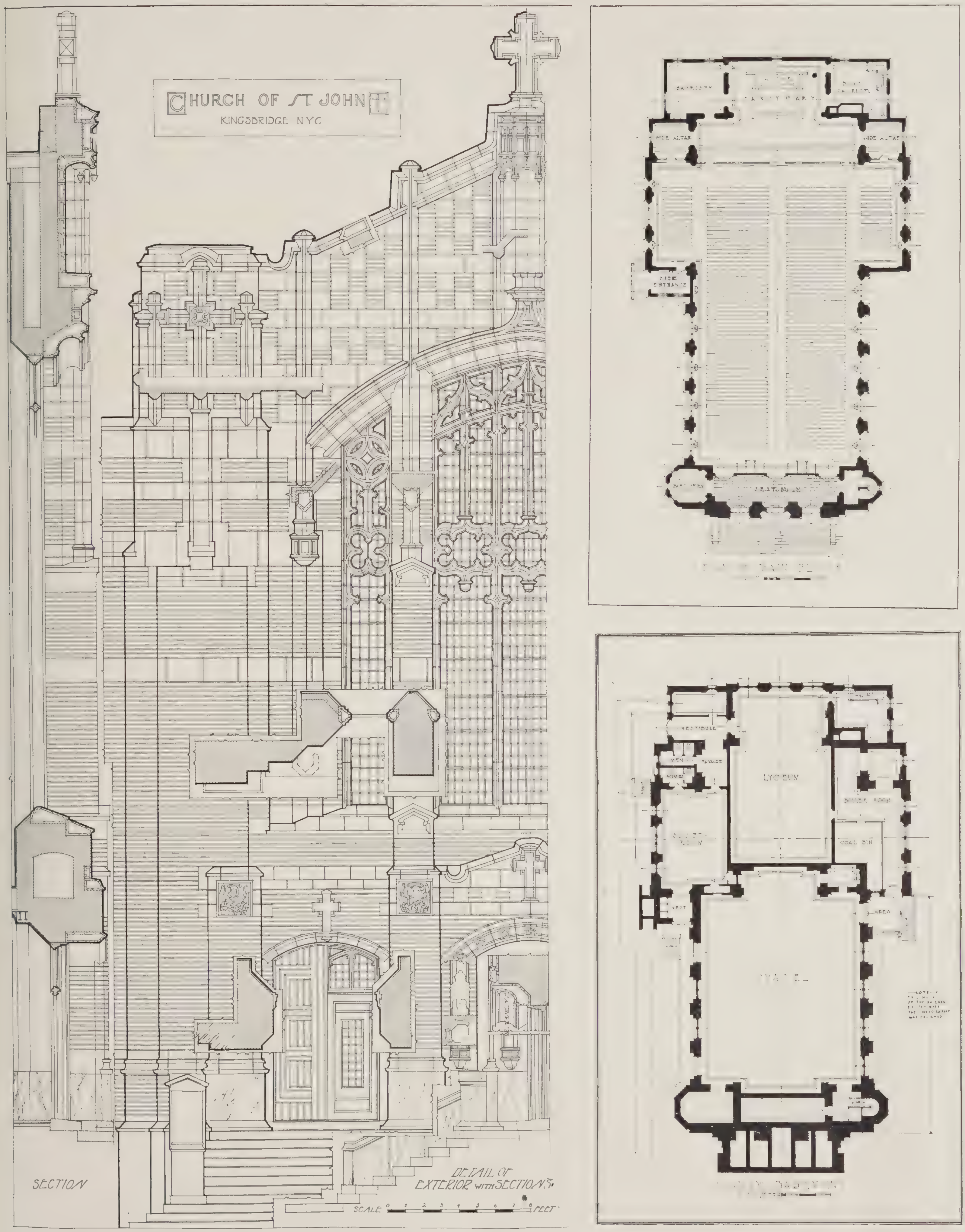
LIVING ROOM.

DINING ROOM.

HOUSE AT WATERBURY, CONN.
CRAM, GOODHUE & FERGUSON, ARCHITECTS.



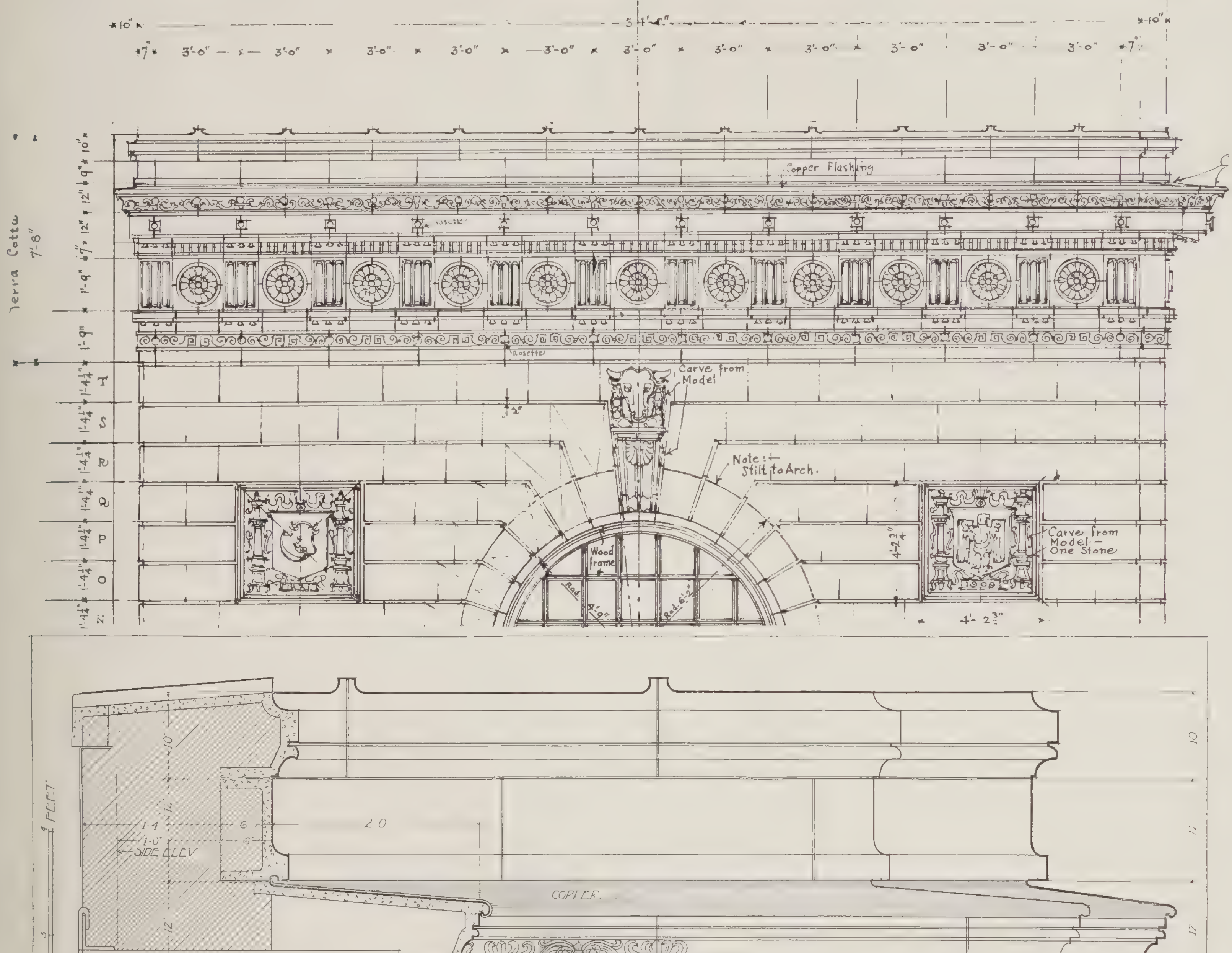
CHURCH OF ST. JOHN, KINGSBRIDGE, NEW YORK CITY.
DAVIS, MCGRATH & KIESSLING, ARCHITECTS.



EXTERIOR DETAIL AND PLANS.

CHURCH OF ST. JOHN, KINGSBRIDGE, NEW YORK CITY.

DAVIS, McGRATH & KIESSLING, ARCHITECTS.



DETAILS OF ENTABLATURE.

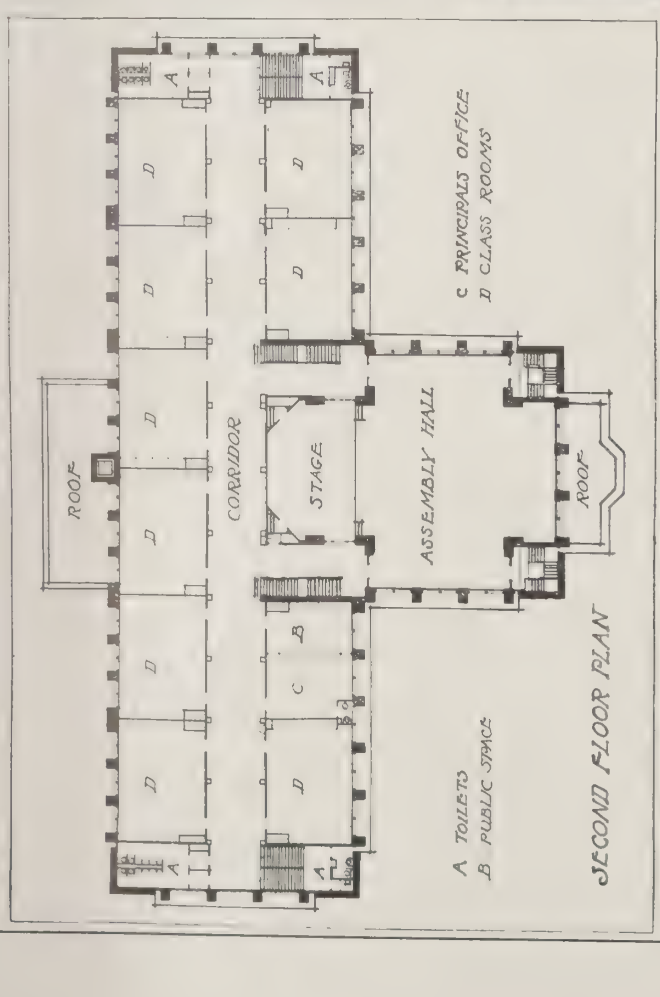
TANNER'S NATIONAL BANK, CATSKILL, N. Y.

MARCUS T. REYNOLDS, ARCHITECT.

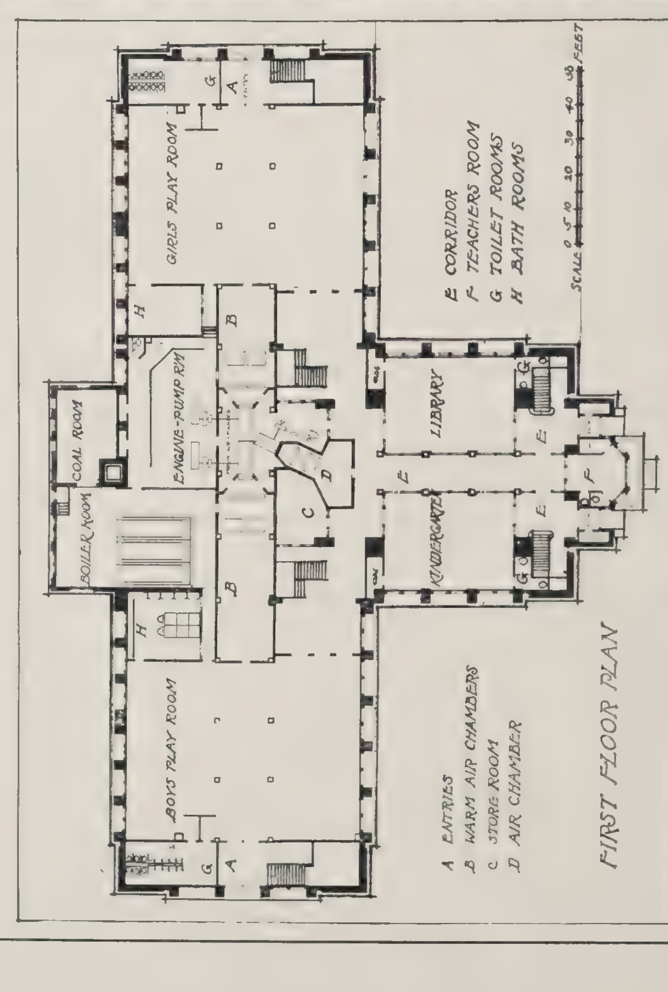
TANNERS NATIONAL BANK
CATSKILL, N. Y.
MARCUS T. REYNOLDS, ARCHITECT.

FIRST FLOOR PLAN

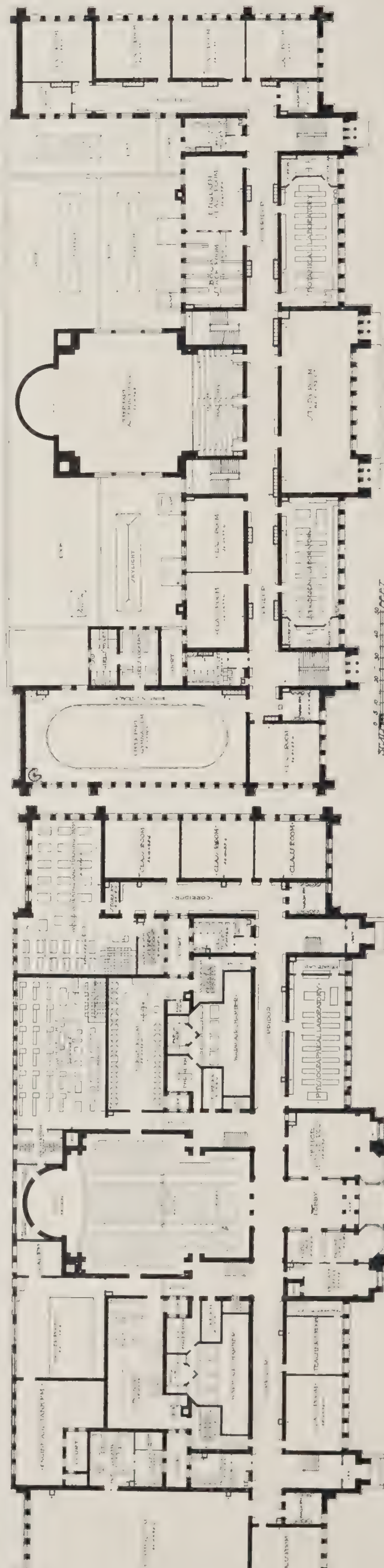
GROVER CLEVELAND HIGH SCHOOL, CHICAGO, ILL.
DWIGHT H. PERKINS, ARCHITECT.



GROVER CLEVELAND HIGH SCHOOL,
CHICAGO, ILL.
DWIGHT H PERKINS, ARCHITECT.



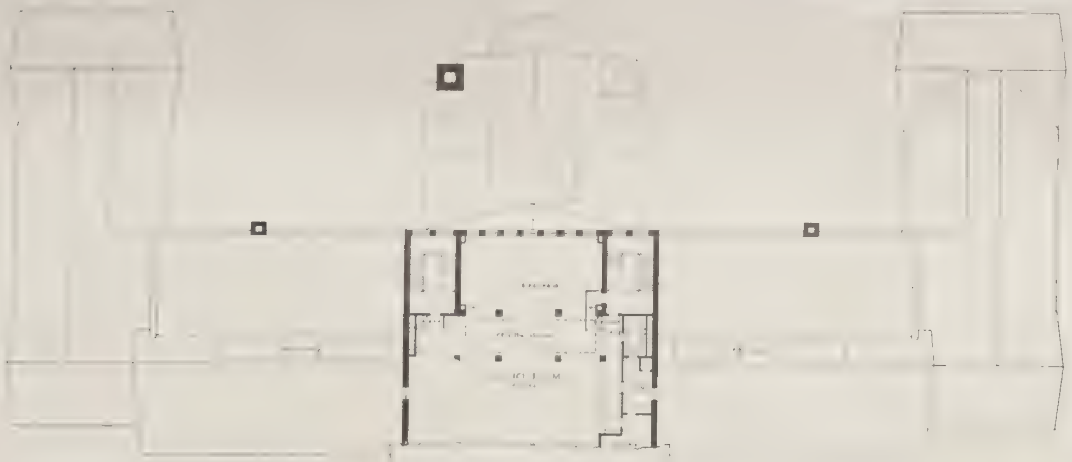
CARL SCHURZ HIGH SCHOOL, CHICAGO, ILL.
DWIGHT H. PERKINS, ARCHITECT.



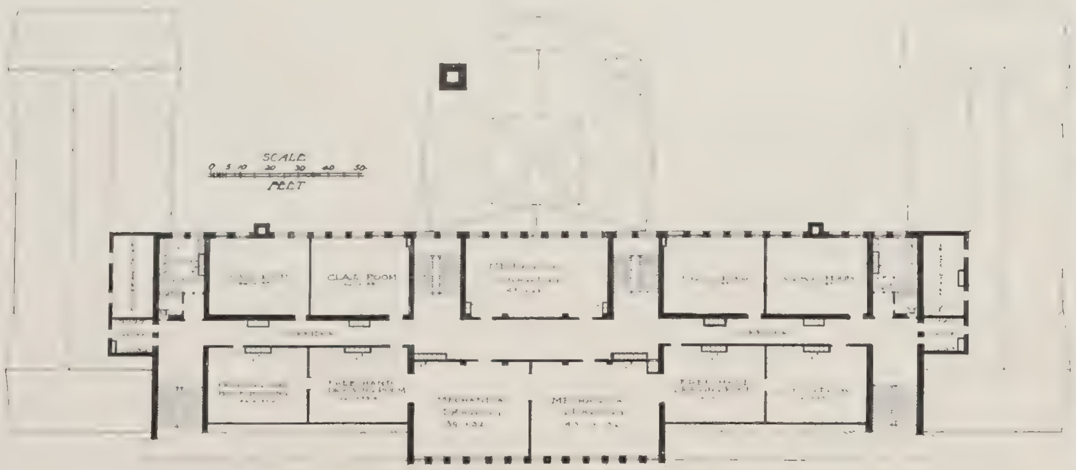
FIRST FLOOR PLAN.

SECOND FLOOR PLAN.

CARL SCHURZ HIGH SCHOOL, CHICAGO, ILL.
DWIGHT H. PERKINS, ARCHITECT.



FIFTH FLOOR PLAN.



FOURTH FLOOR PLAN.

THIRD FLOOR PLAN.

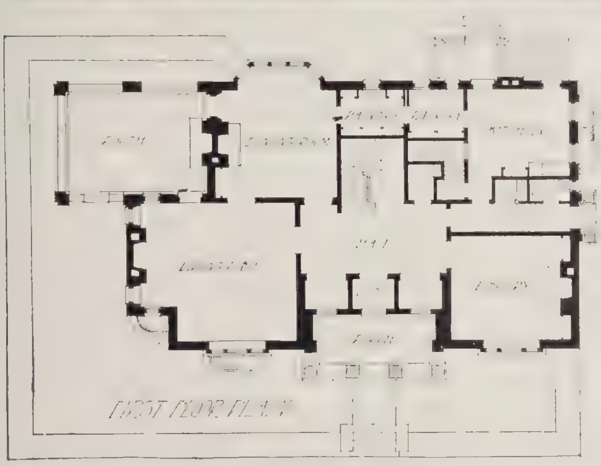
CARL SCHURZ HIGH SCHOOL, CHICAGO, ILL.
DWIGHT H. PERKINS, ARCHITECT.

HOUSE AT CLEVELAND, OHIO.
FRANK B. MEADE, ARCHITECT.

HOUSE
AT
CLEVELAND,
OHIO.
FRANK B. MEADE,
ARCHITECT.

HALL.

SUN ROOM.



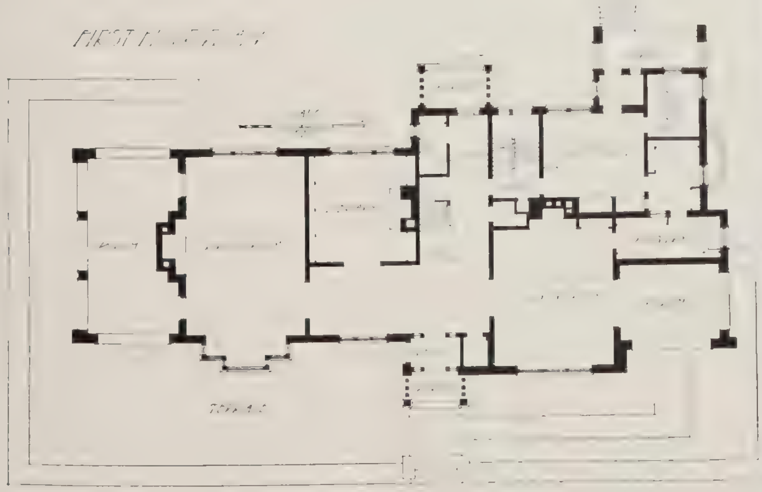
HOUSE
AT
CLEVELAND,
OHIO.

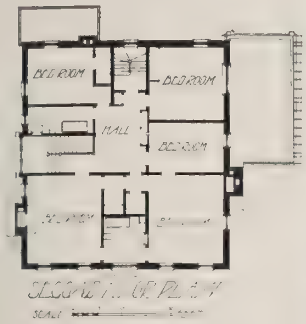
FRANK B. MEADE,
ARCHITECT.

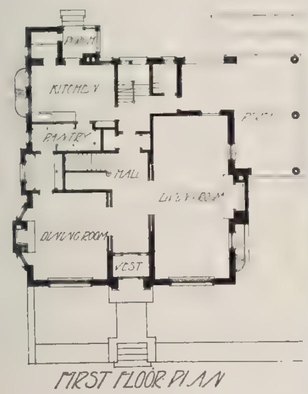
DINING ROOM.

HALL.

HOUSE AT CLEVELAND, OHIO.
FRANK B. MEADE, ARCHITECT.



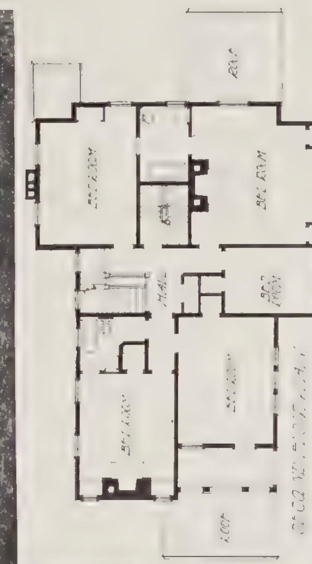


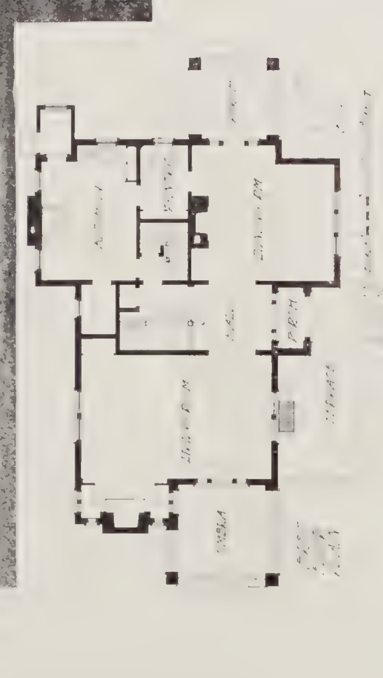


HOUSE AT CLEVELAND, OHIO.
FRANK B. MEADE, ARCHITECT.

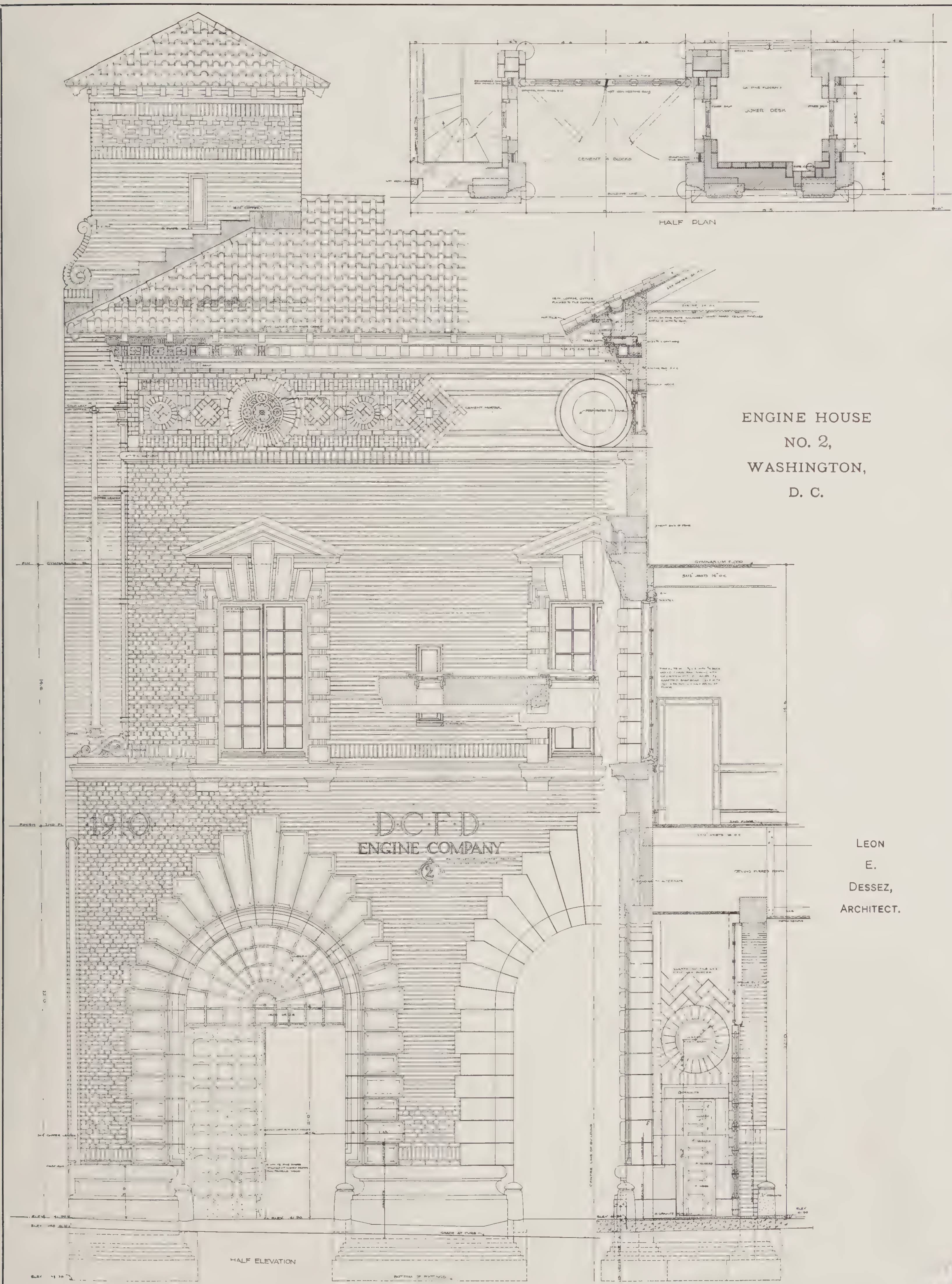
HOUSE AT CLEVELAND, OHIO.
FRANK B. MEADE, ARCHITECT.

HOUSE AT CLEVELAND, OHIO.
FRANK B MEADE, ARCHITECT





HOUSE AT LAWRENCE PARK, WEST,
BRONXVILLE, N. Y.
WILLIAM A. BATES, ARCHITECT.

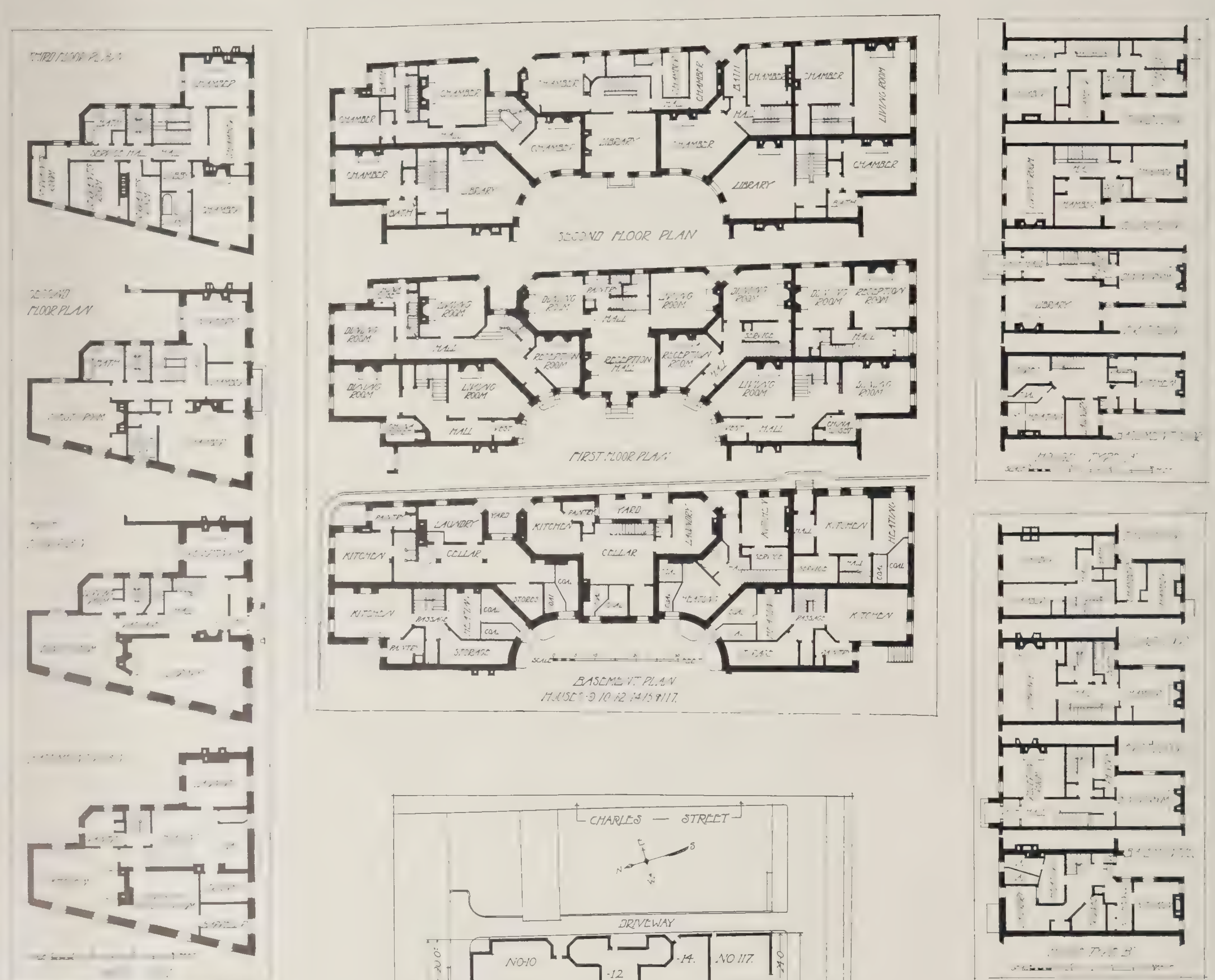


ENGINE HOUSE
NO. 2,
WASHINGTON,
D. C.

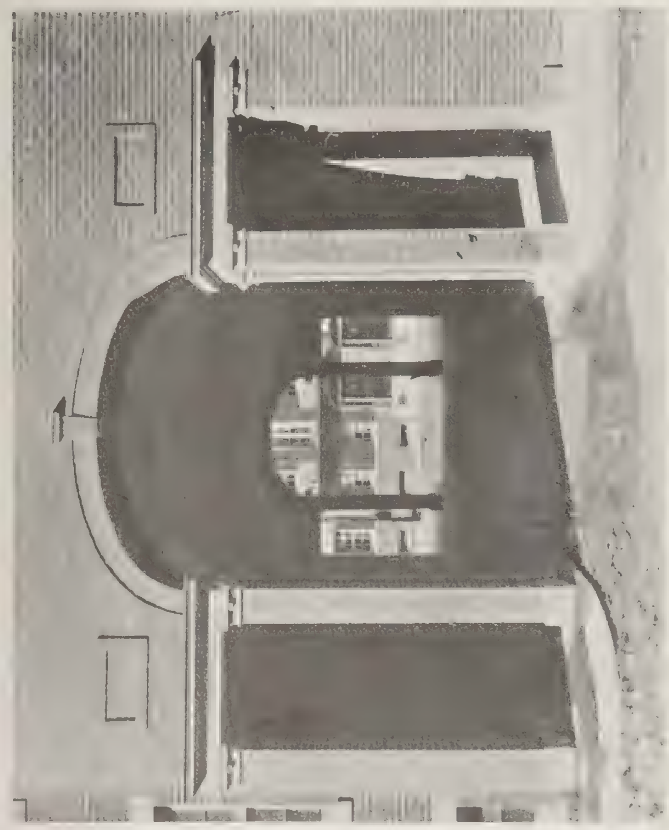
LEON
E.
DESSEZ,
ARCHITECT.

ENGINE HOUSE NO. 2,
WASHINGTON, D. C.
LEON E. DESSEZ, ARCHITECT.

HOUSES ON CHARLES RIVER EMBANKMENT, BOSTON, MASS.
FRANK A. BOURNE, ARCHITECT.



HOUSES ON CHARLES RIVER EMBANKMENT, BOSTON, MASS.
Frank A. Bourne, Architect.

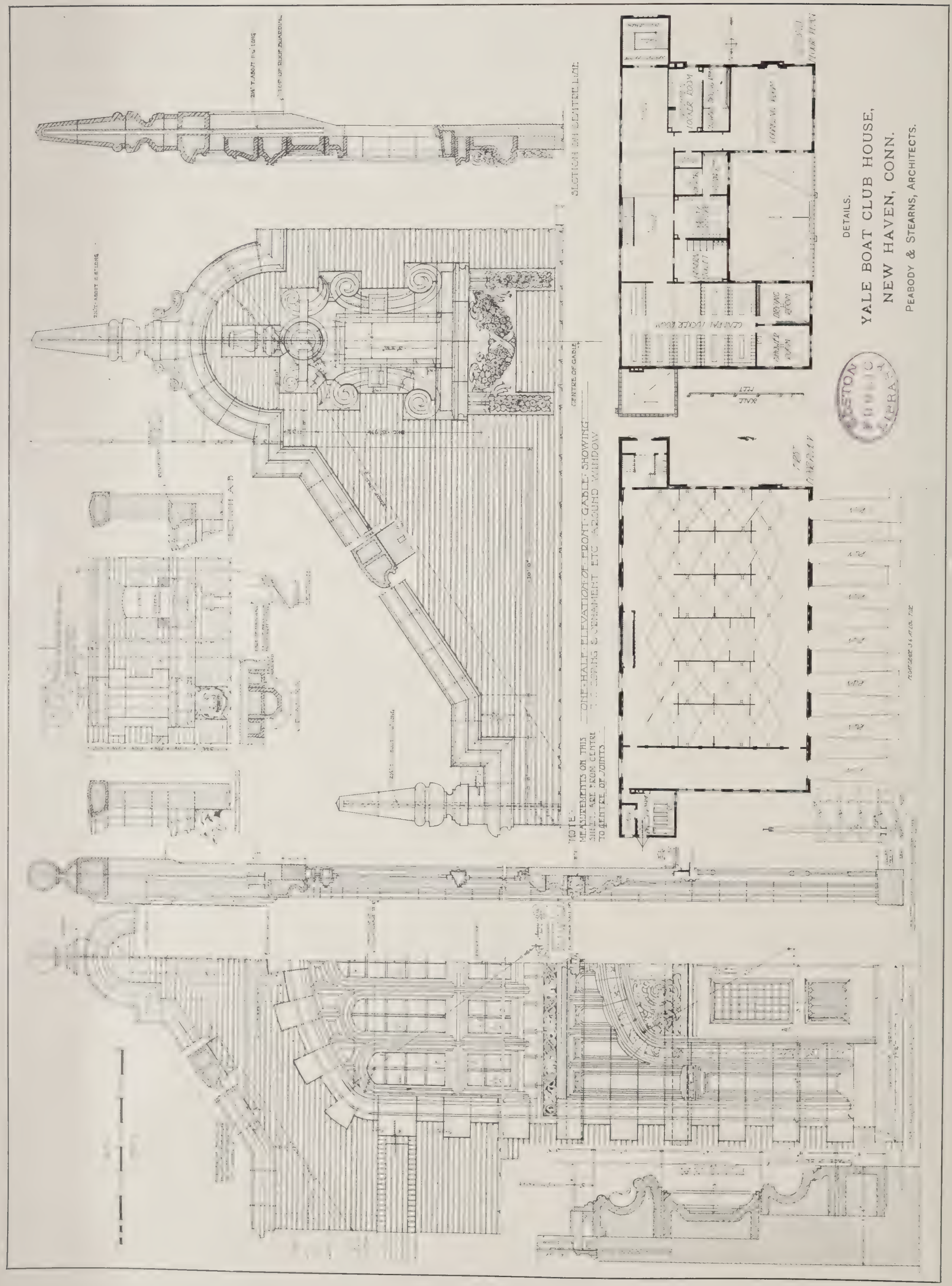


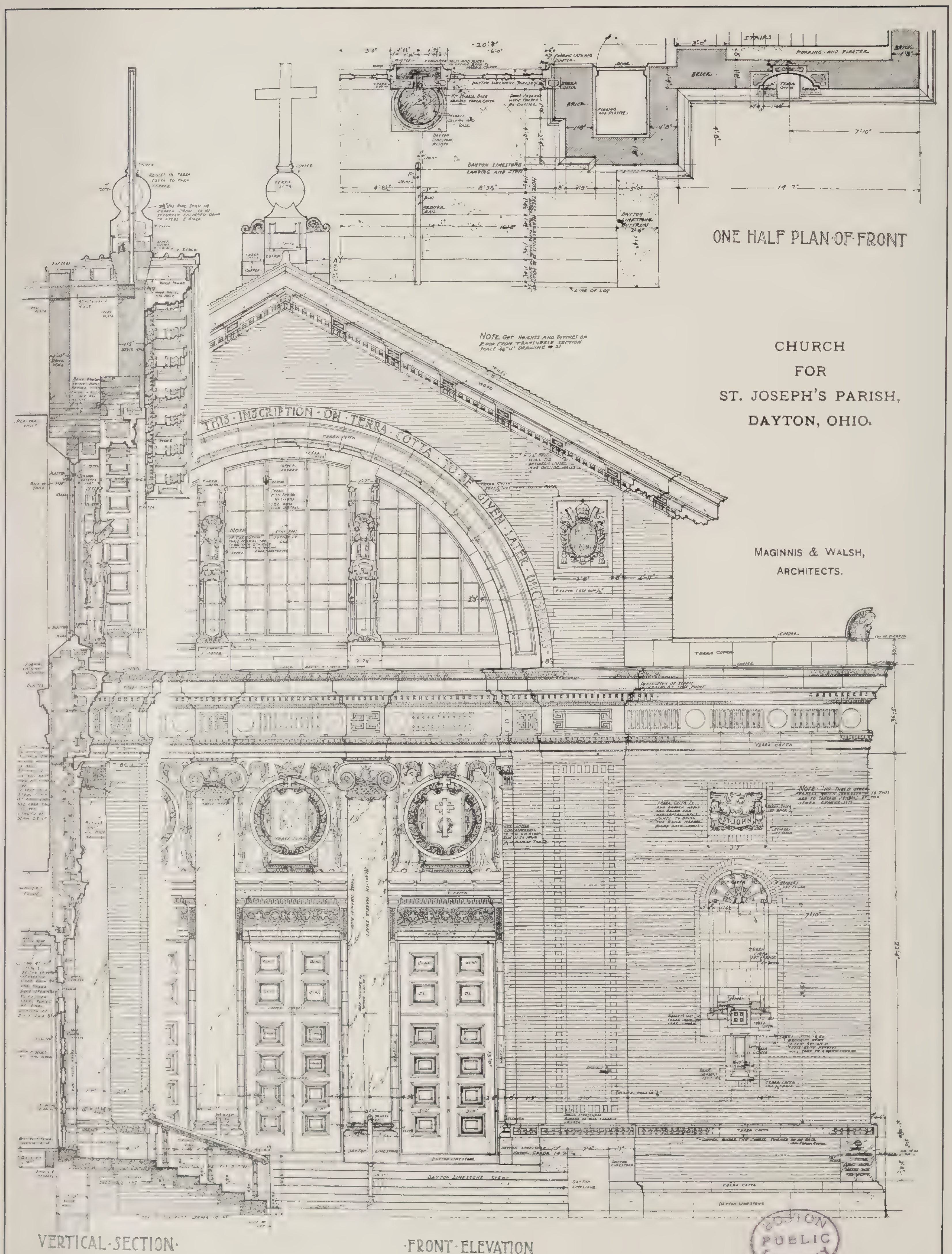
PASSAGE

HOUSES ON CHARLES RIVER EMBANKMENT.
BOSTON, MASS.
FRANK A. BOURNE, ARCHITECT.

LIBRARY.

YALE BOAT CLUB HOUSE, NEW HAVEN, CONN.
PEABODY & STEARNS, ARCHITECTS.

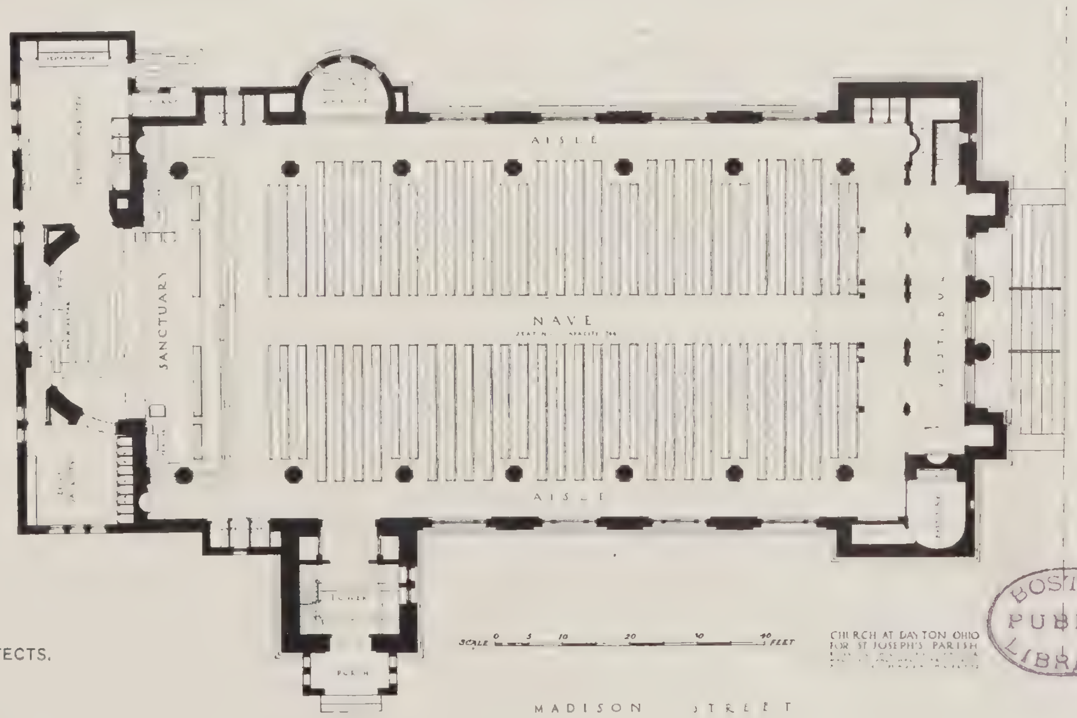

SECTION ON CENTRE LINE
CENTRE OF GABLE
ONE HALF ELEVATION OF FRONT GABLE SHOWING
NOTE:
MEASUREMENTS ON THIS
SHEET ARE FROM CENTRE
TO CENTRE OF JOINTS
GENERAL LOCKER ROOM
DRYING ROOM
DETAILS.
YALE BOAT CLUB HOUSE,
NEW HAVEN, CONN.
PEABODY & STEARNS, ARCHITECTS.



CHURCH
FOR
ST. JOSEPH'S PARISH,
DAYTON, OHIO.

MAGINNIS & WALSH,
ARCHITECTS.

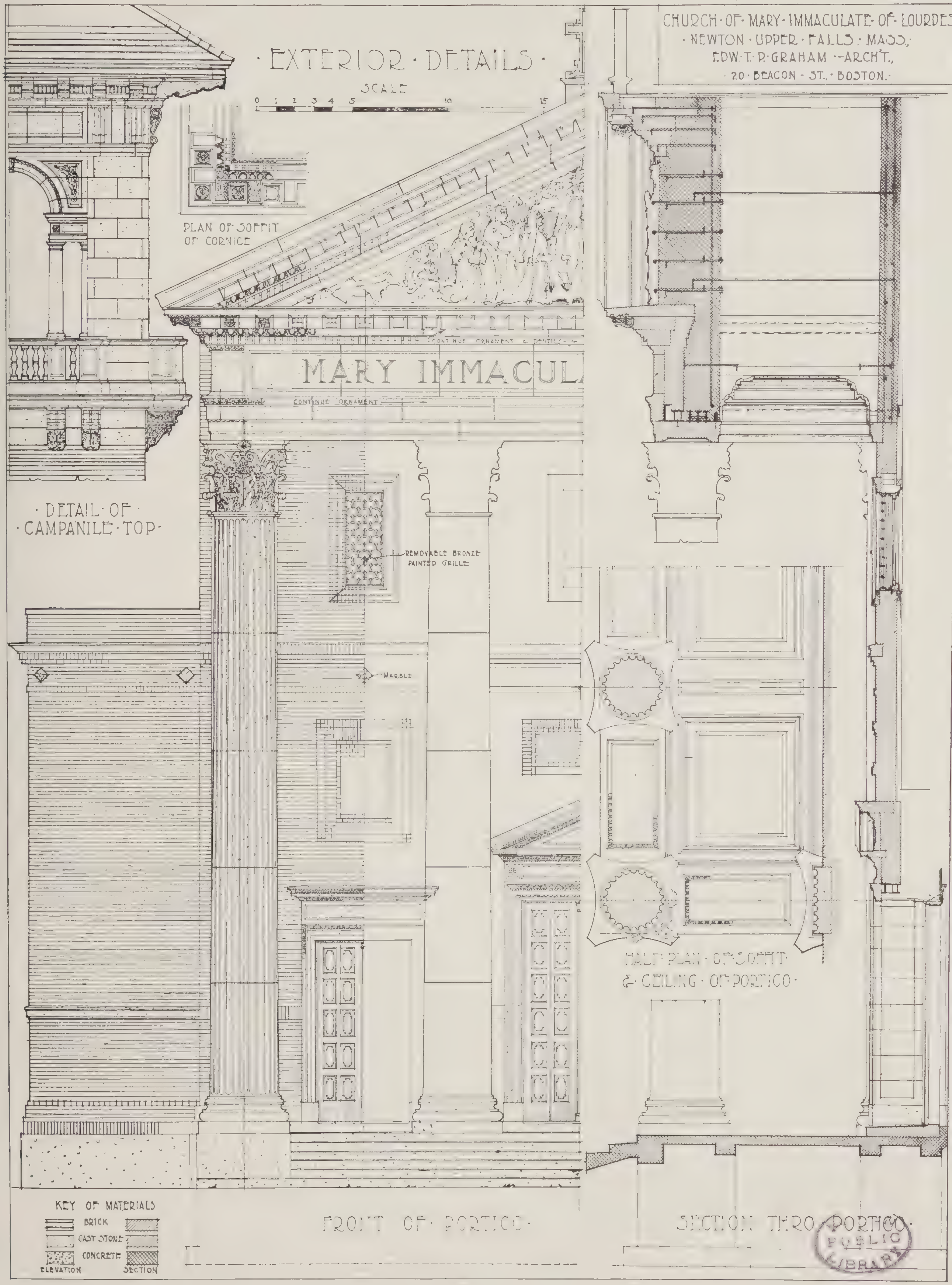
CHURCH FOR ST. JOSEPH'S PARISH, DAYTON, OHIO.
MAGINNIS & WALSH, ARCHITECTS.



CHURCH
FOR
ST. JOSEPH'S PARISH,
DAYTON, OHIO.

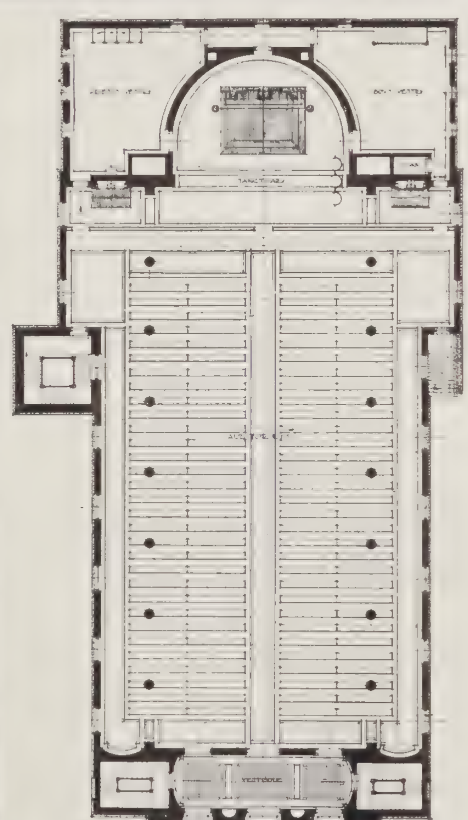
MAGINNIS & WALSH, ARCHITECTS.

CHURCH OF MARY IMMACULATE OF LOURDES,
NEWTON UPPER FALLS, MASS.
EDWARD T. P. GRAHAM, ARCHITECT.



CHURCH OF MARY IMMACULATE OF LOURDES, NEWTON UPPER FALLS, MASS.

EDWARD T. P. GRAHAM, ARCHITECT.



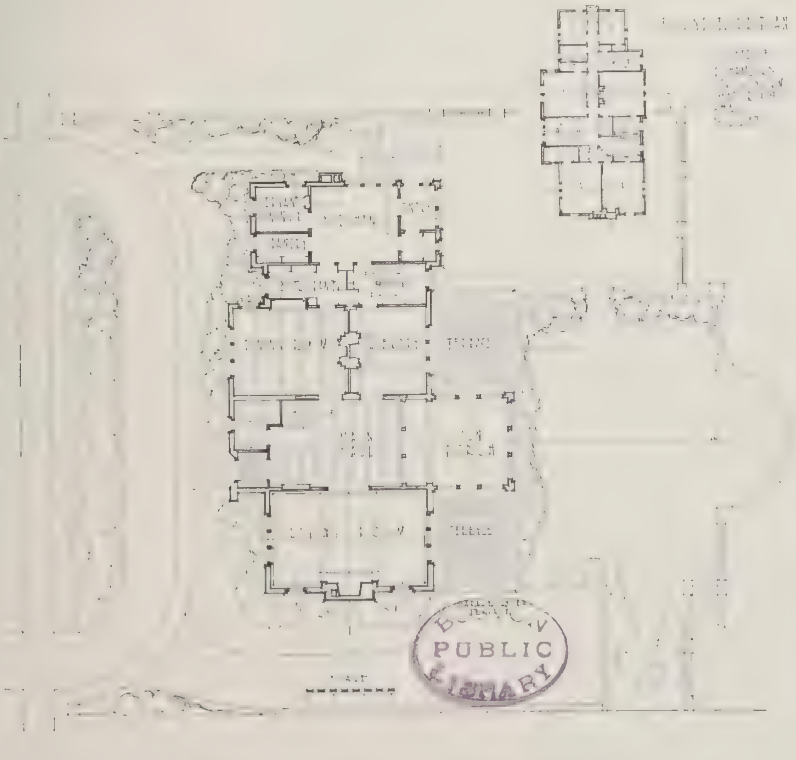
CHURCH OF MARY IMMACULATE OF LOURDES,
NEWTON UPPER FALLS, MASS.
EDWARD T. P. GRAHAM, ARCHITECT

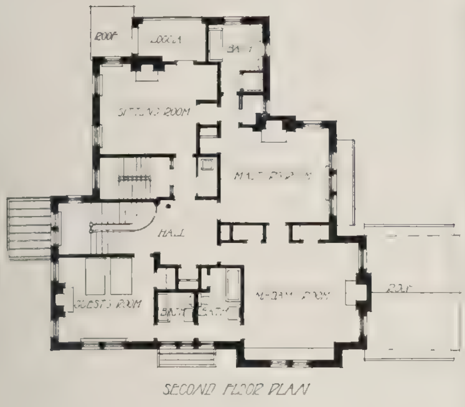
FIRST FLOOR PLAN

HOUSE AT MINNEAPOLIS, MINN.

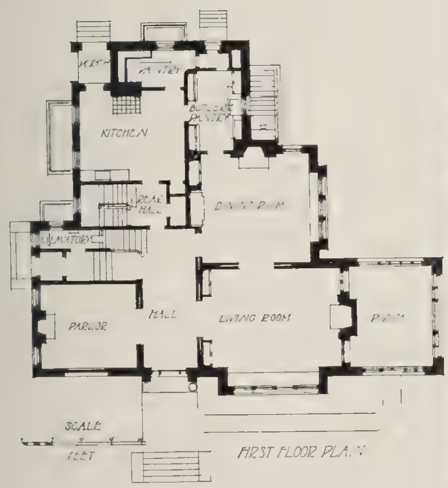
WILLIAM M. KENYON,

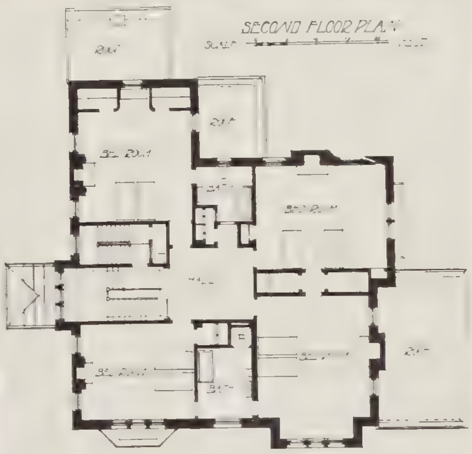
ARCHITECT.





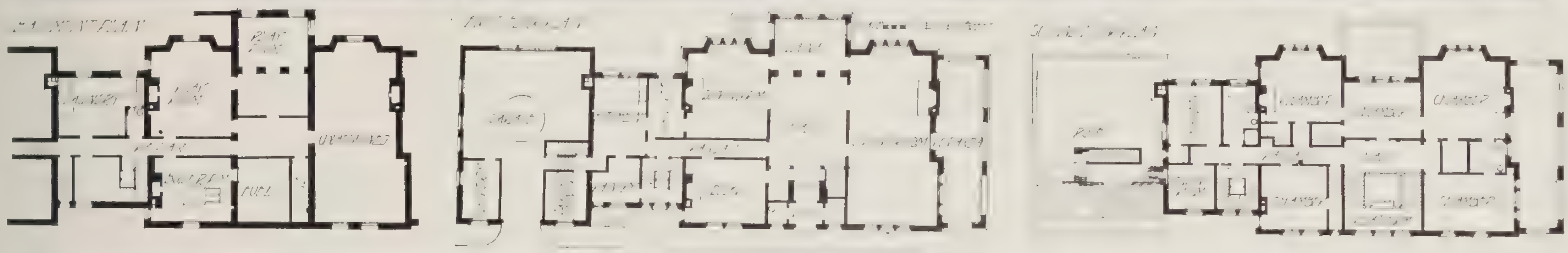
ON WILKINS AVENUE.





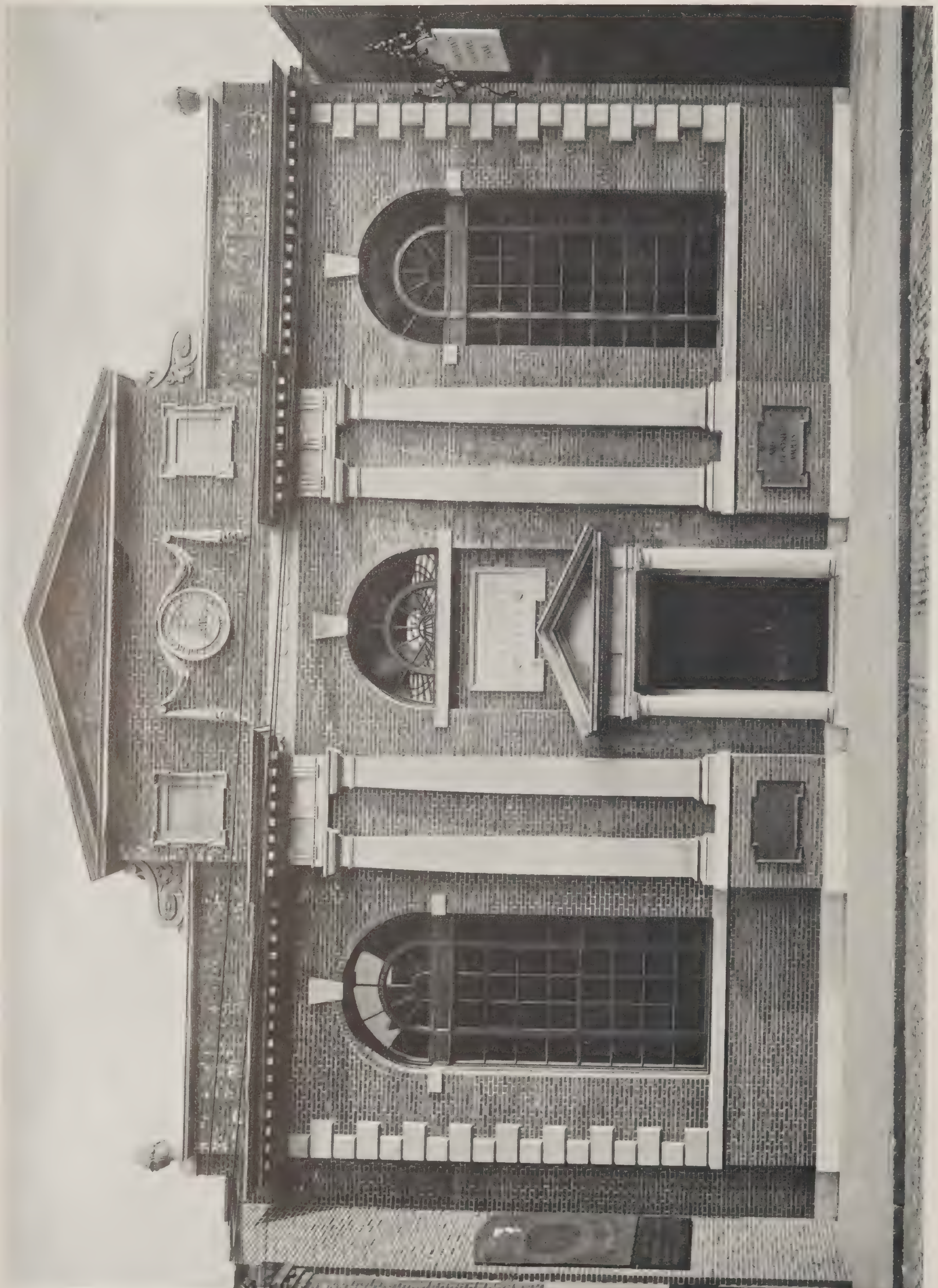
ON SHADY AVENUE

TWO HOUSES AT PITTSBURG, PA.
MACCLURE & SPAHR, ARCHITECTS.

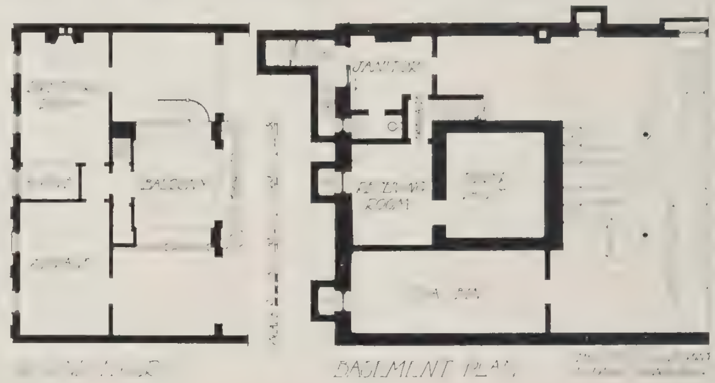


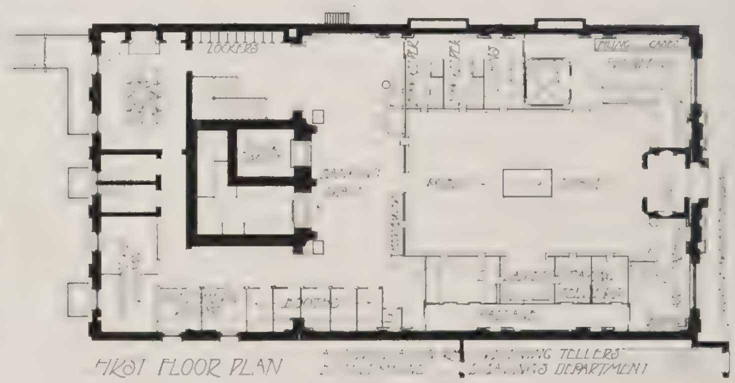
HOUSE AT MINNEAPOLIS, MINN.
REED & STEM, ARCHITECTS.

TECHNICAL HIGH SCHOOL, NEWTON, MASS.
GEORGE F. NEWTON, ARCHITECT.



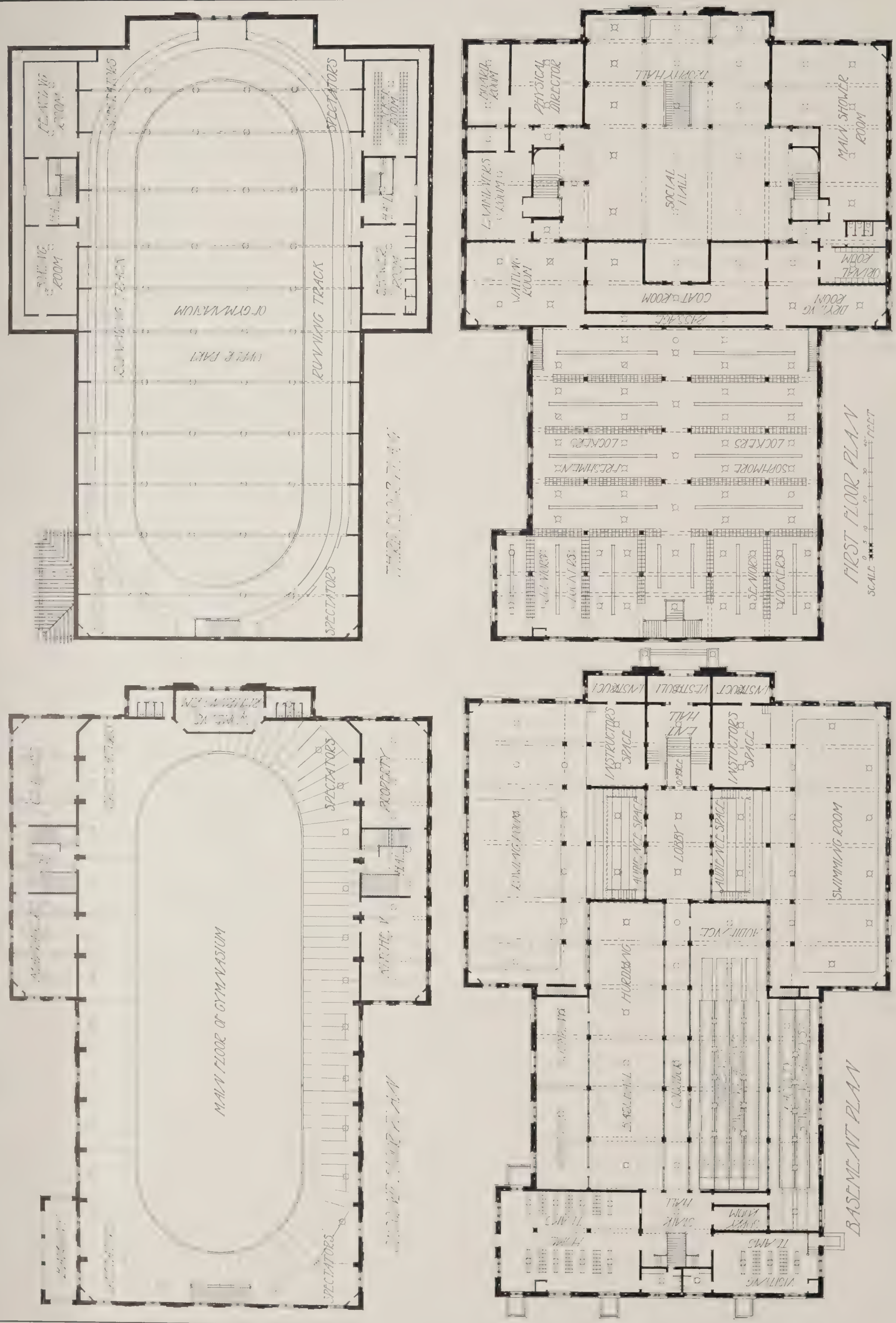
MERCHANTS NATIONAL BANK, SALEM, MASS.
LITTLE & BROWNE, ARCHITECTS.





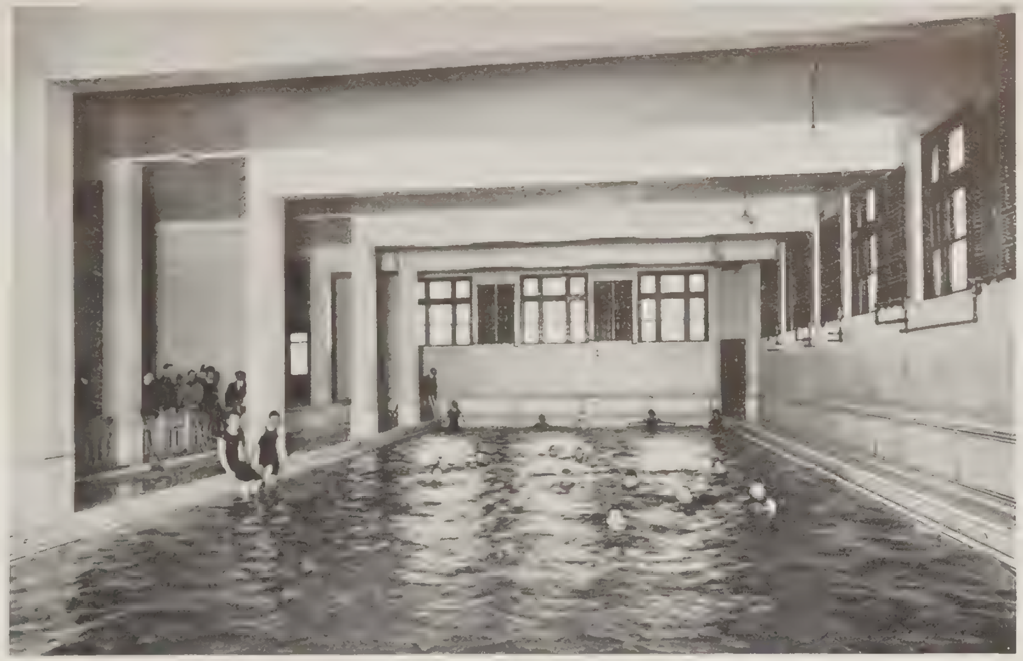
MERCHANTS NATIONAL BANK, SALEM, MASS.
LITTLE & BROWNE, ARCHITECTS.

GYMNASIUM AT SYRACUSE UNIVERSITY, SYRACUSE, N. Y.
REVELS & HALLENBECK, ARCHITECTS.



GYMNASIUM AT SYRACUSE UNIVERSITY, SYRACUSE, N. Y.

Revels & Hallenbeck, Architects.



SWIMMING TANK.

ROWING ROOM

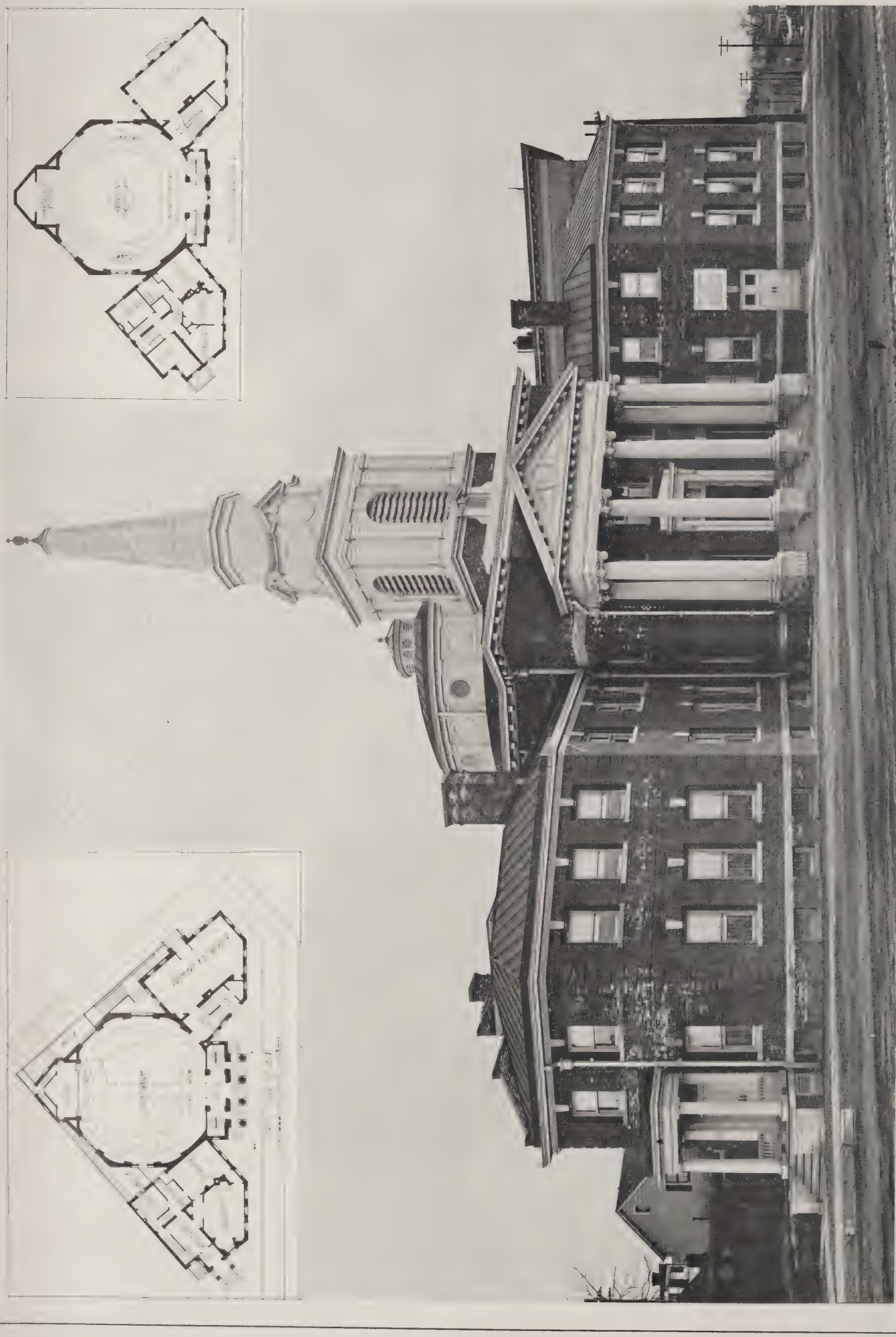
GYMNASIUM ROOM.

SHOWER ROOM.

INTERIOR VIEWS.

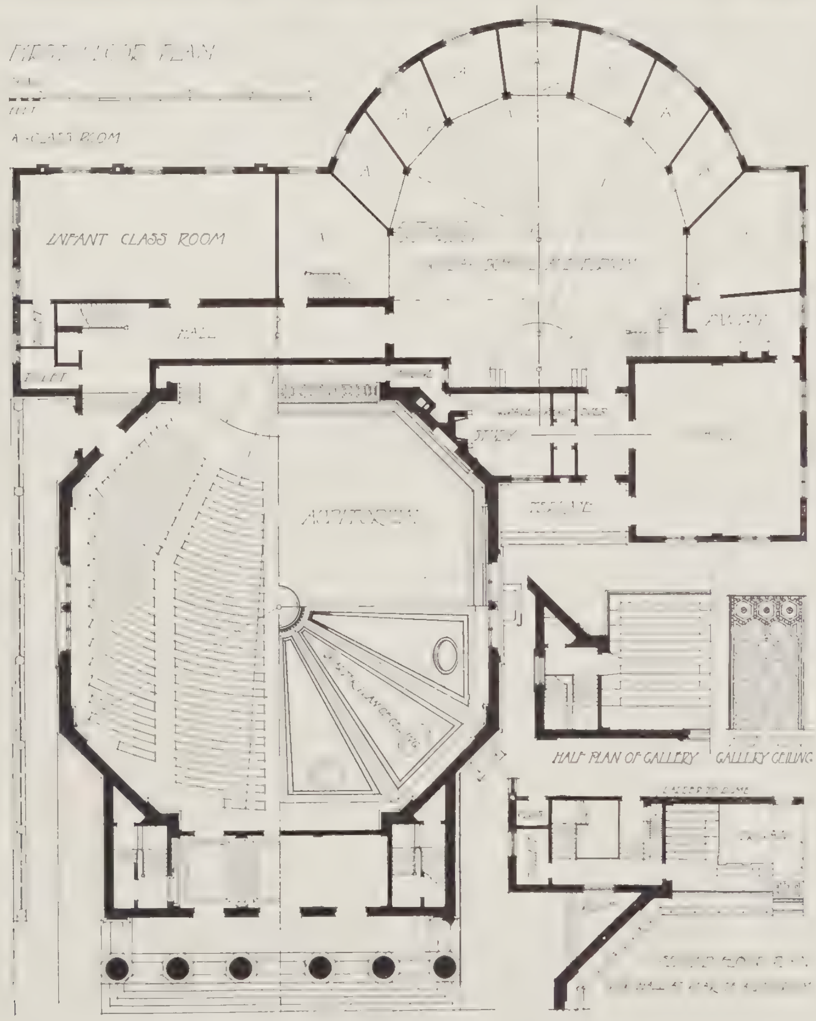
GYMNASIUM AT SYRACUSE UNIVERSITY, SYRACUSE, N. Y.

REVELS & HALLENBECK, ARCHITECTS.



CHRIST CONGREGATIONAL CHURCH, NEW YORK CITY.
HOPPIN & KOEN, ARCHITECTS.

PRESBYTERIAN CHURCH, CHATTANOOGA, TENN.
BEARDEN & FOREMAN AND MCKIM, MEAD & WHITE, ASSOCIATED ARCHITECTS.

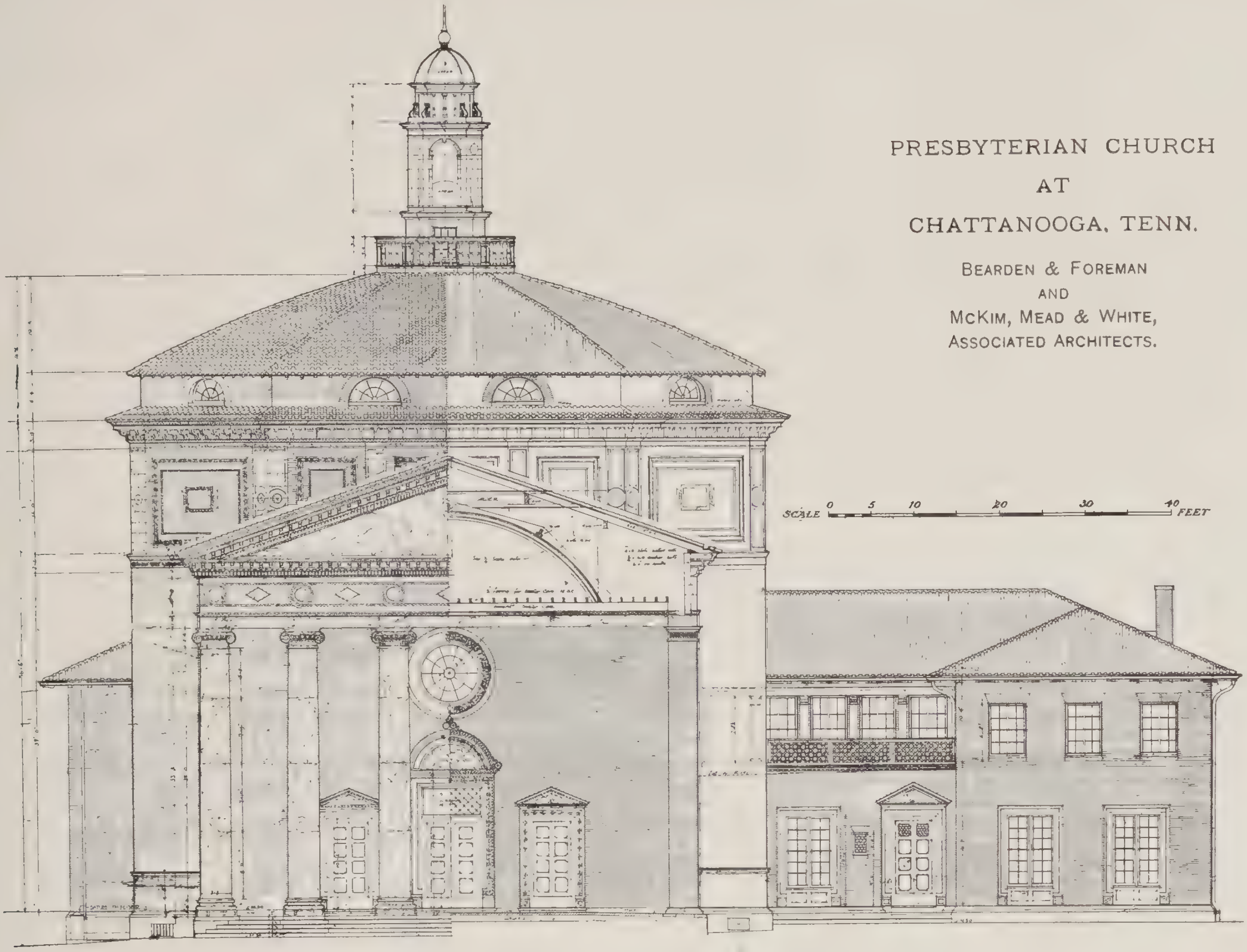


PRESBYTERIAN CHURCH AT CHATTANOOGA, TENN.

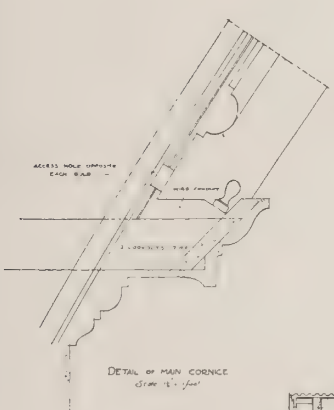
BEARDEN & FOREMAN AND McKIM, MEAD & WHITE,
ASSOCIATED ARCHITECTS.

PRESBYTERIAN CHURCH AT CHATTANOOGA, TENN.

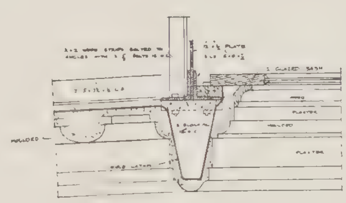
BEARDEN & FOREMAN AND McKIM, MEAD & WHITE, ASSOCIATED ARCHITECTS.



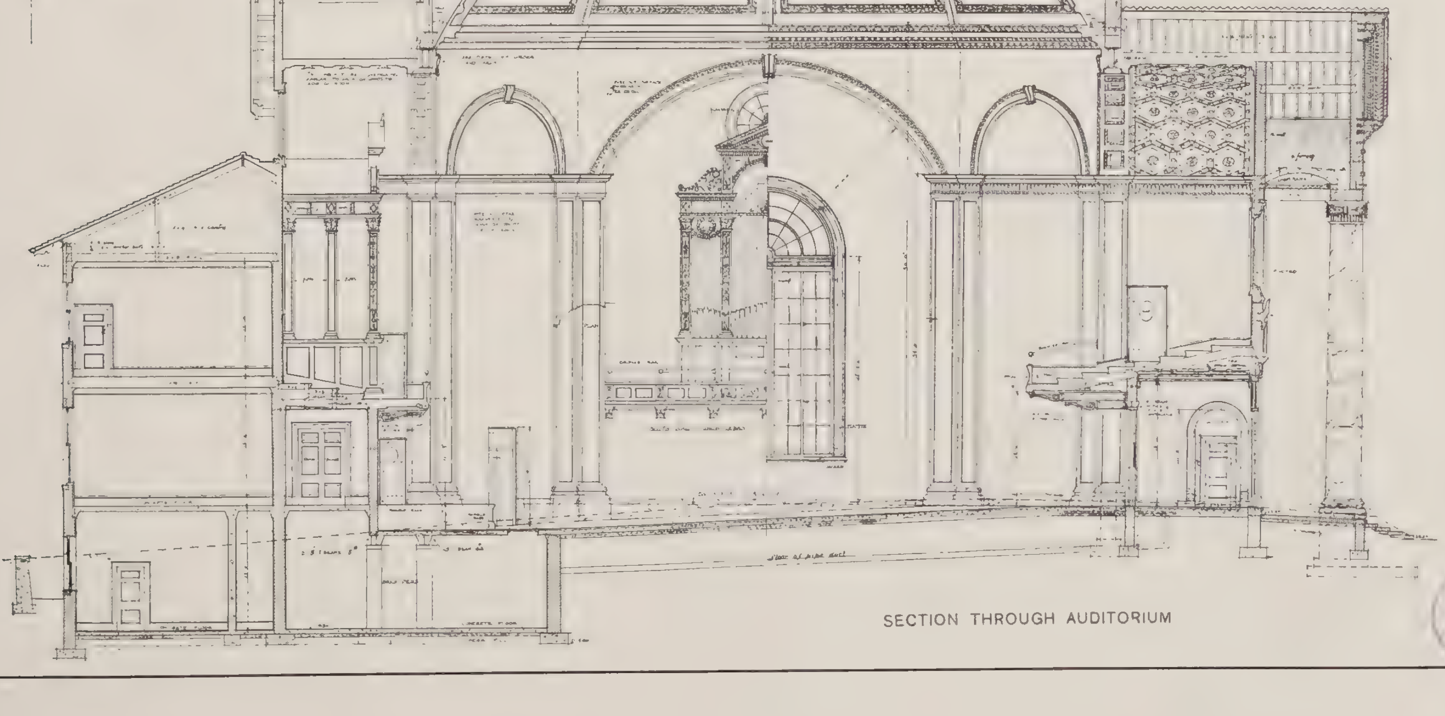
FRONT ELEVATION



DETAIL OF MAIN CORNICE



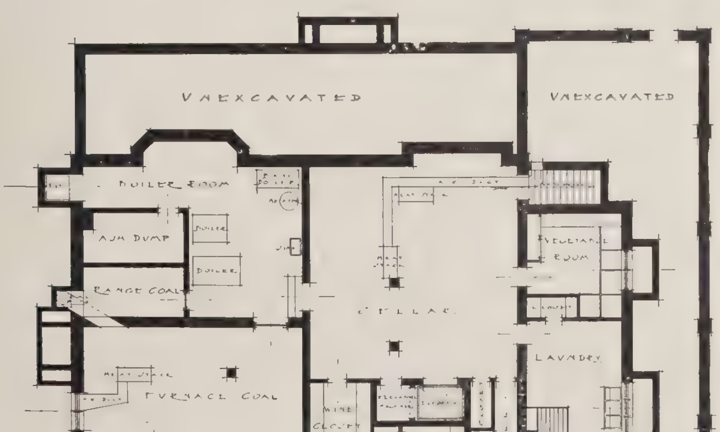
DETAIL AT BASE OF DRUM



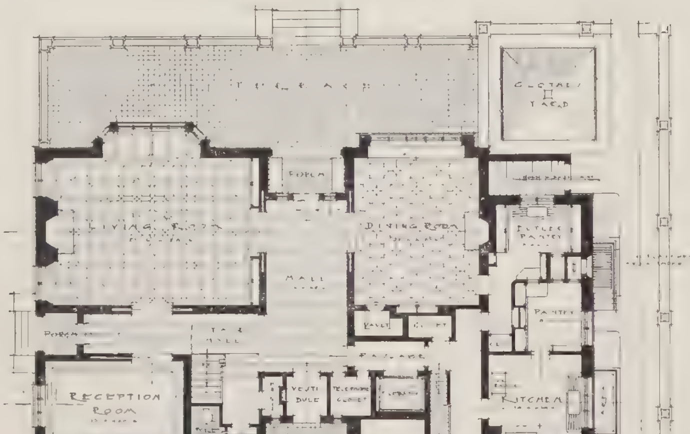
SECTION THROUGH AUDITORIUM

SECOND FLOOR PLAN

THIRD FLOOR PLAN



BASEMENT PLAN



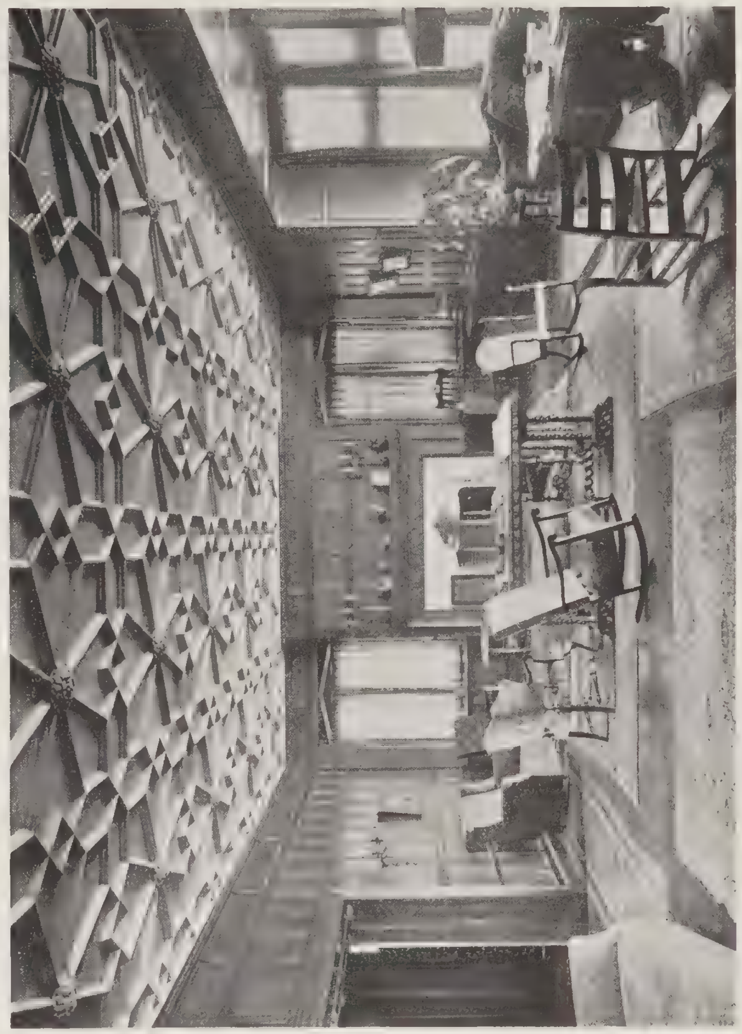
FIRST FLOOR PLAN

HOUSE AT DETROIT, MICH.

GEORGE HUNT INGRAHAM, ARCHITECT

GARDEN FACADE.

PLAY ROOM.

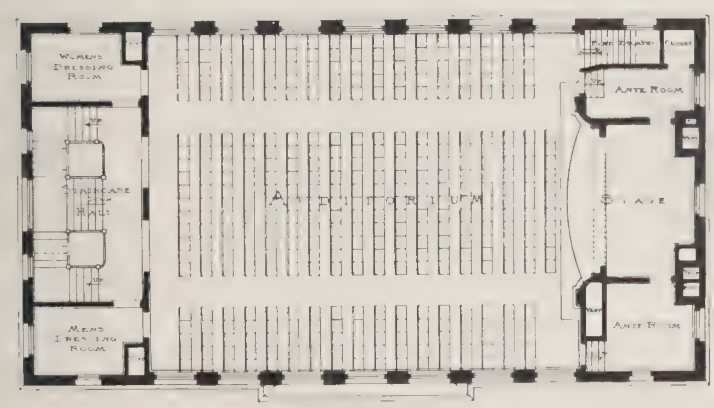


LIVING ROOM.

DINING ROOM.

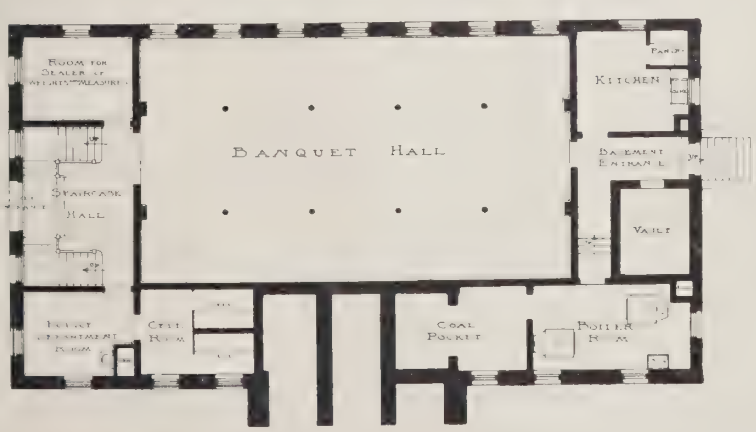
HOUSE AT DETROIT, MICH.
GEORGE HUNT INGRAHAM, ARCHITECT.

VOL. 20, NO. 6. PLATE 83.

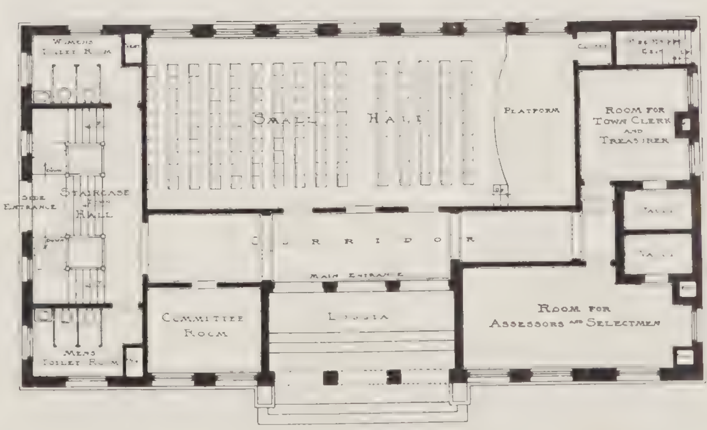


·Second·Floor·Plan·

·Third·Floor·Plan·



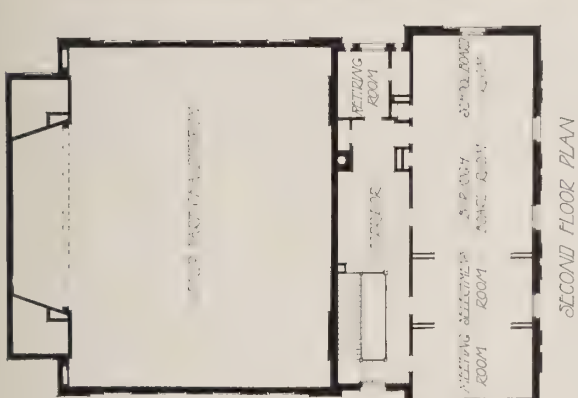
·Basement·Plan·

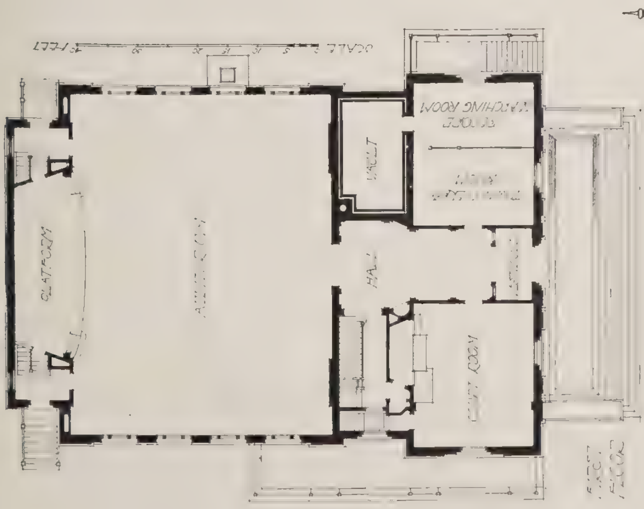


·First·Floor·Plan·

TOWN HALL, WESTWOOD, MASS.

HURD & GORE, ARCHITECTS.



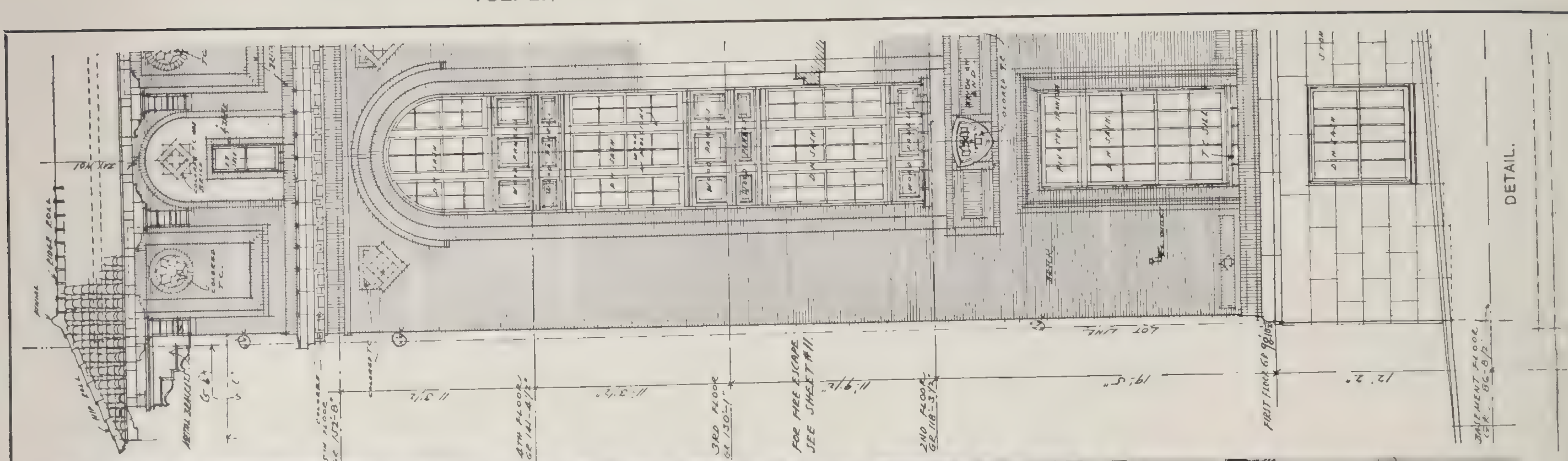


TOWN HALL AND OFFICES
OF
NEW CANAAN, CONN.

EDGAR A. JOSSELYN,
ARCHITECT

SCHOOL OF INDUSTRIAL ARTS, TRENTON, N. J.
CASS GILBERT, ARCHITECT

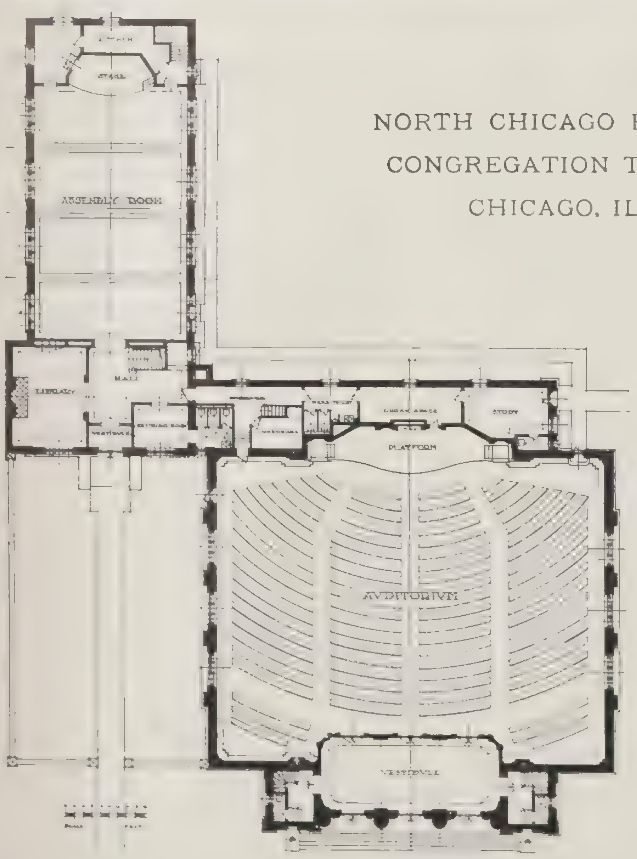
VOL. 20, NO. 7. PLATE 86.



DETAIL.

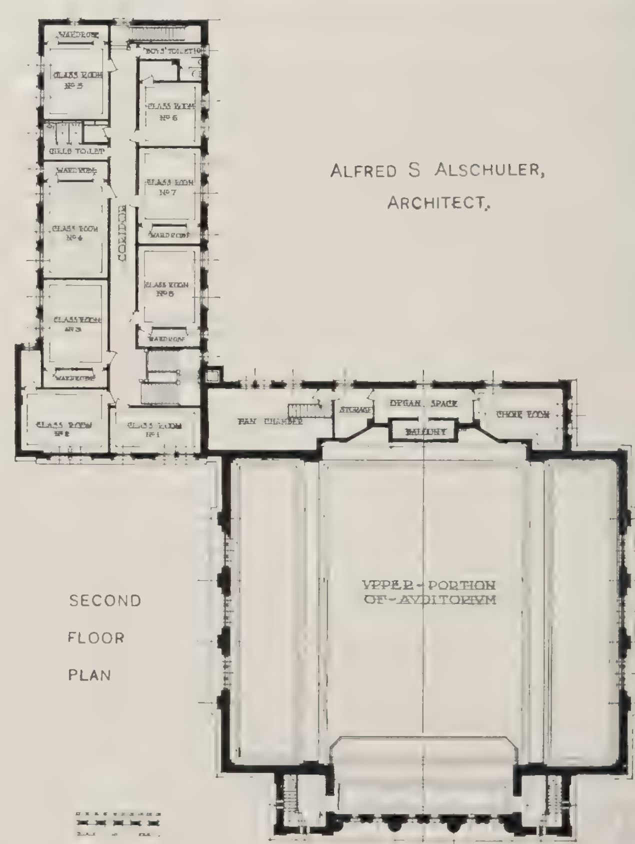
DETAIL OF ENTRANCE.

SCHOOL OF
INDUSTRIAL ARTS, TRENTON N J.
CASS GILBERT, ARCHITECT



NORTH CHICAGO HEBREW
CONGREGATION TEMPLE,
CHICAGO, ILL.

FIRST
FLOOR
PLAN.

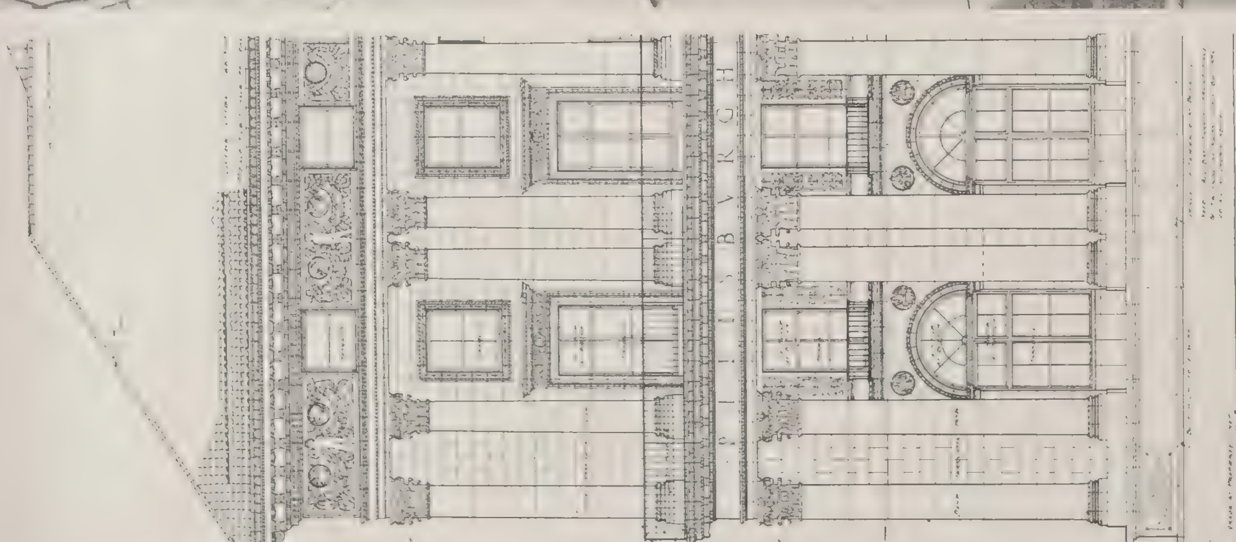


ALFRED S ALSCHULER,
ARCHITECT,

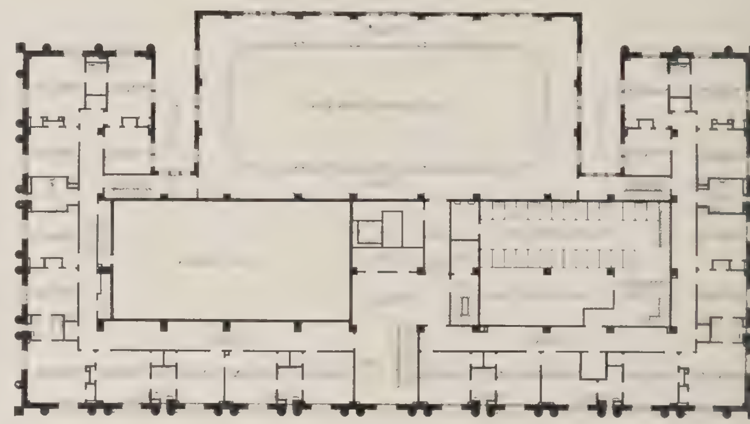
SECOND
FLOOR
PLAN

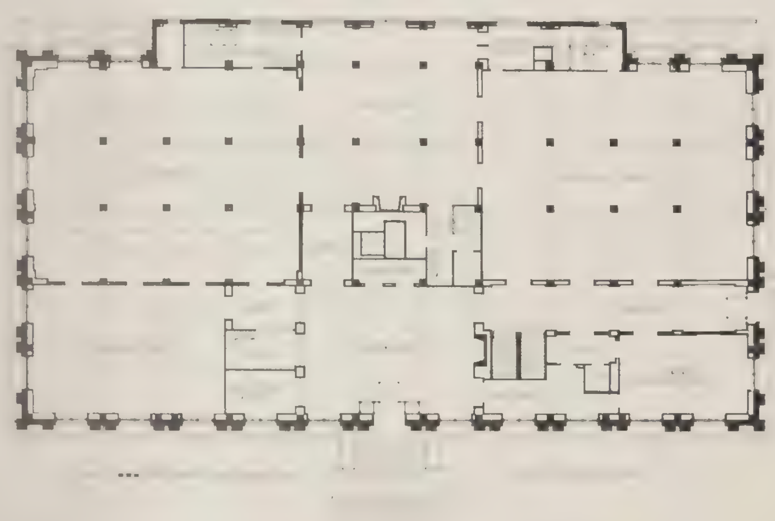
CLUB HOUSE FOR THE PITTSBURGH ATHLETIC ASSOCIATION, PITTSBURG, PA.

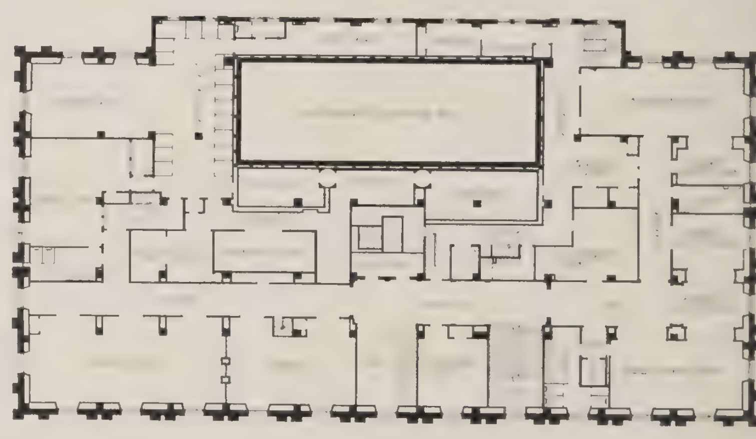
JANSSEN & ABBOTT, ARCHITECTS.

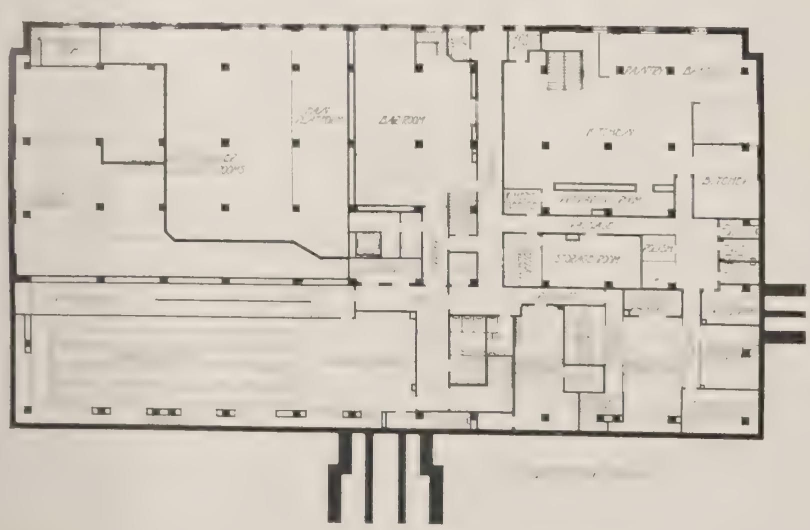


DETAIL AT CORNER OF MAIN ELEVATION.









CLUB HOUSE
FOR THE
PITTSBURGH ATHLETIC ASSOCIATION,
PITTSBURG, PA.

JANSSEN & ABBOTT, ARCHITECTS.

REAR ELEVATION.

CLUB HOUSE FOR THE PITTSBURGH ATHLETIC ASSOCIATION, PITTSBURG, PA.

JANSSEN & ABBOTT, ARCHITECTS.

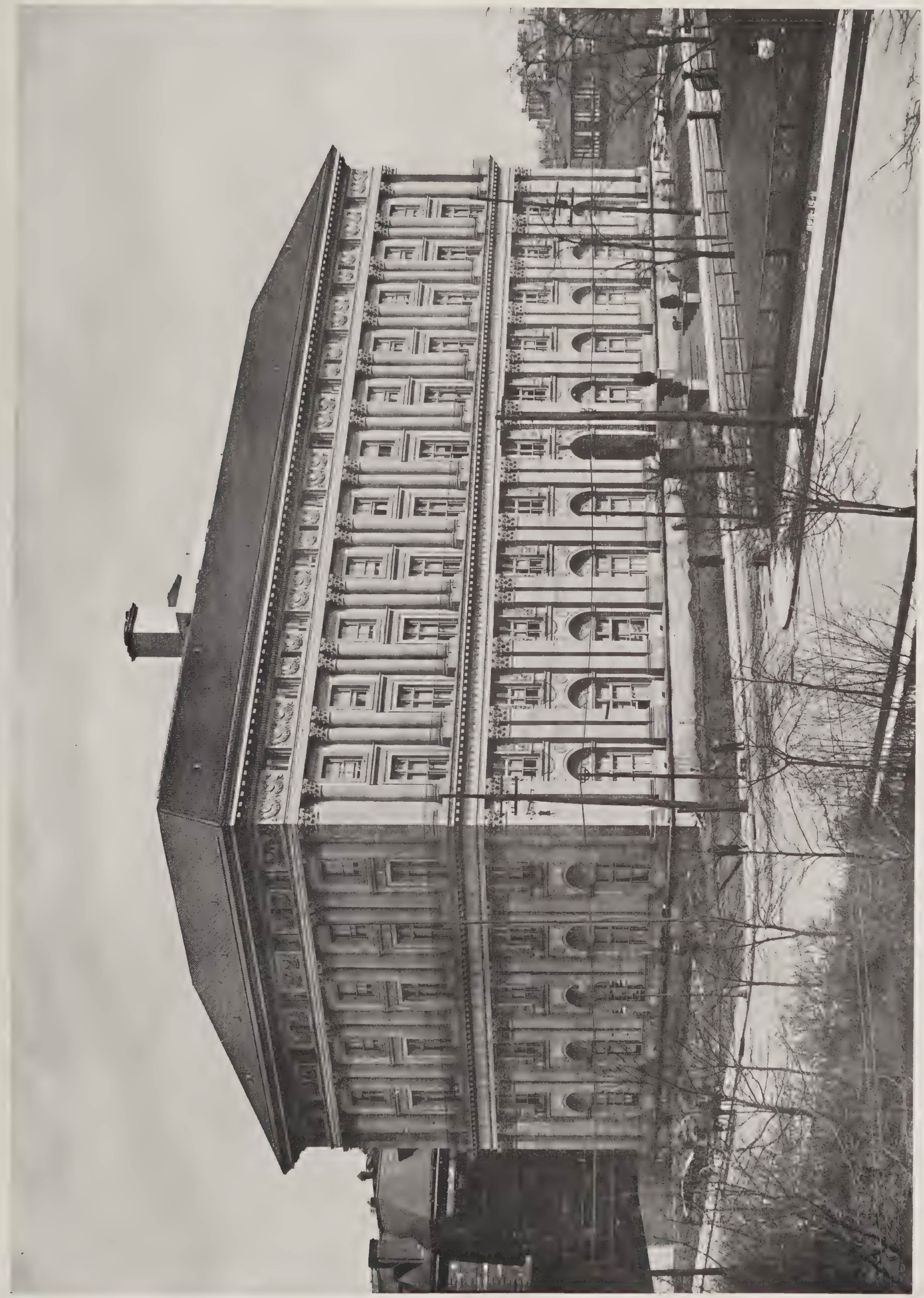
SWIMMING POOL

LOUNGING ROOM.

MAIN LOBBY

CLUB HOUSE FOR THE PITTSBURGH ATHLETIC ASSOCIATION, PITTSBURG, PA.

JANSSEN & ABBOTT, ARCHITECTS.



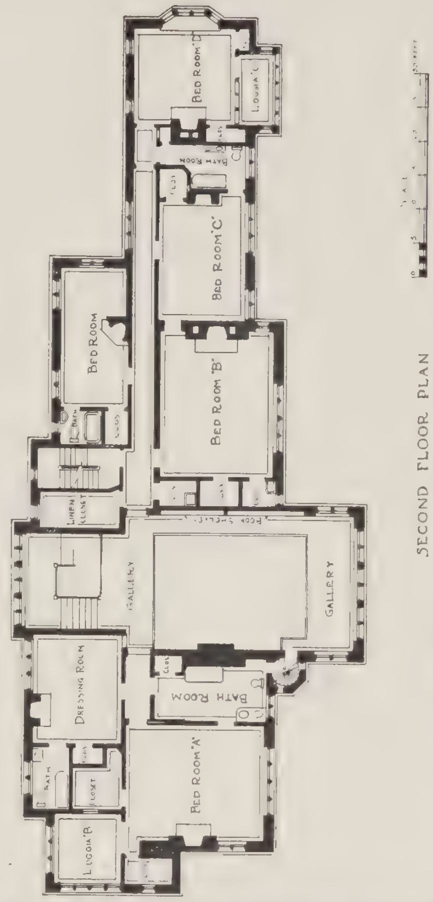
CLUB HOUSE FOR THE PITTSBURGH ATHLETIC ASSOCIATION, PITTSBURG, PA.
JANSSEN & ABBOTT, ARCHITECTS.

HOUSE AT ROSLYN HEIGHTS, PA.
COPE & STEWARDSON, ARCHITECTS.

GARAGE.

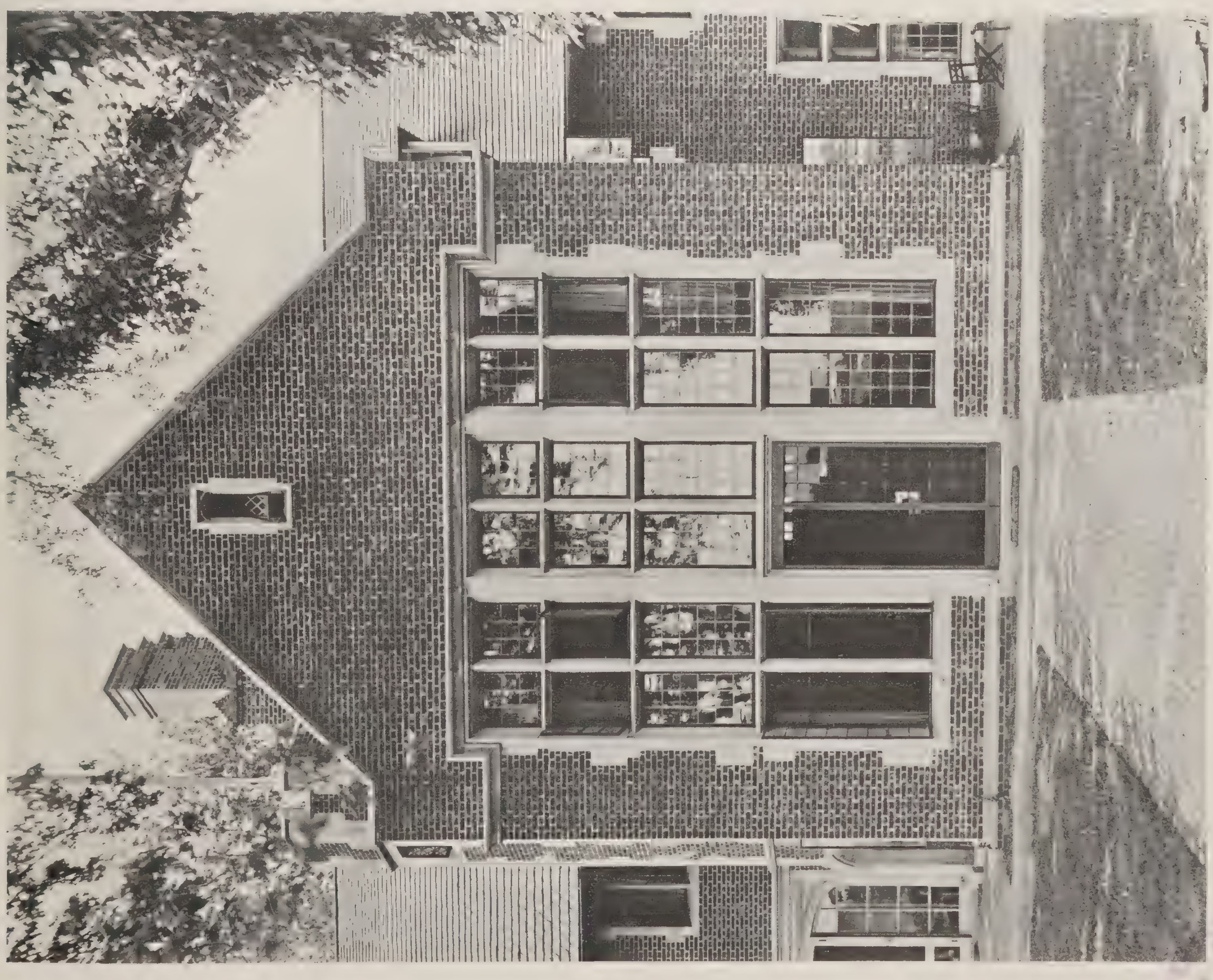
HOUSE AND GARAGE AT ROSLYN HEIGHTS, PA.

COPE & STEWARDSON, ARCHITECTS.



SECOND FLOOR PLAN

FIRST FLOOR PLAN

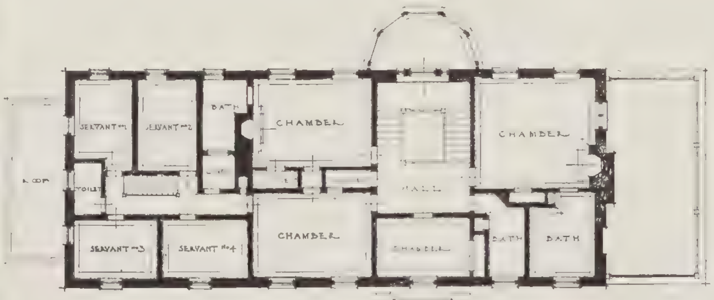


MAIN ENTRANCE.

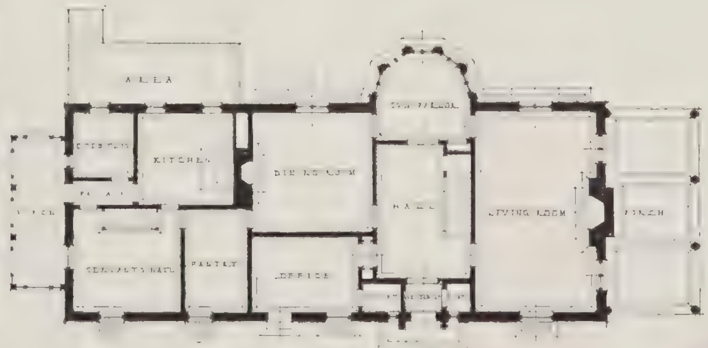
HOUSE AT HAVRE DE GRACE, MARYLAND.
PARKER, THOMAS & RICE, ARCHITECTS

HOUSE AT HAVRE DE GRACE, MARYLAND.

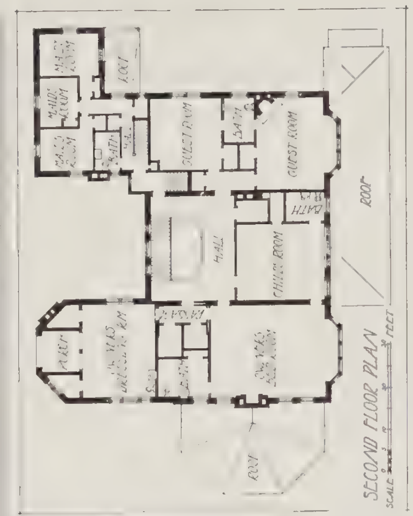
PARKER, THOMAS & RICE, ARCHITECTS.

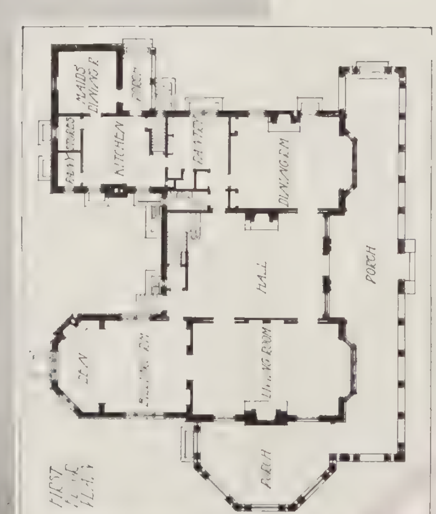


SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

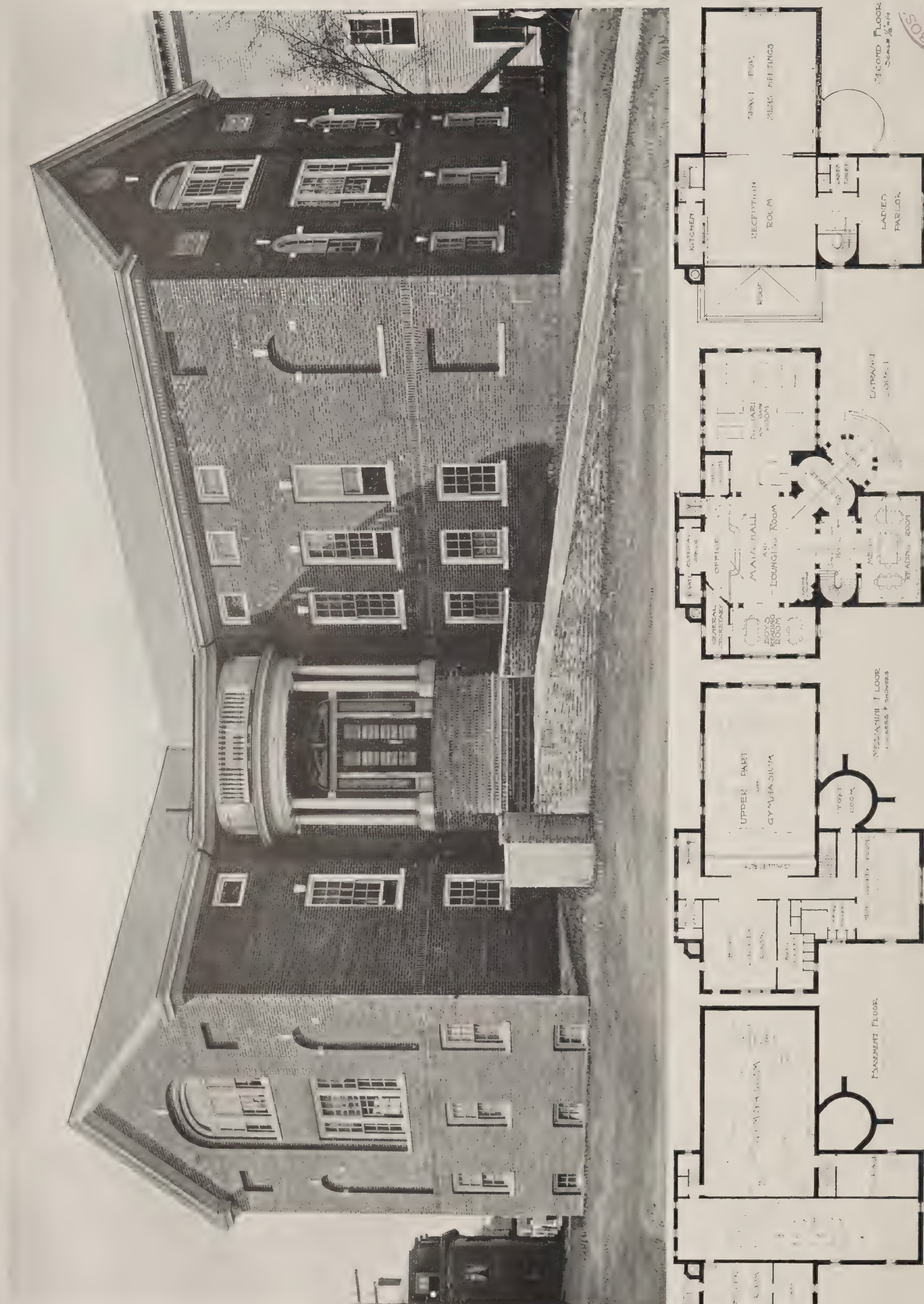




HOUSE AT OVERBROOK, PENNSYLVANIA.

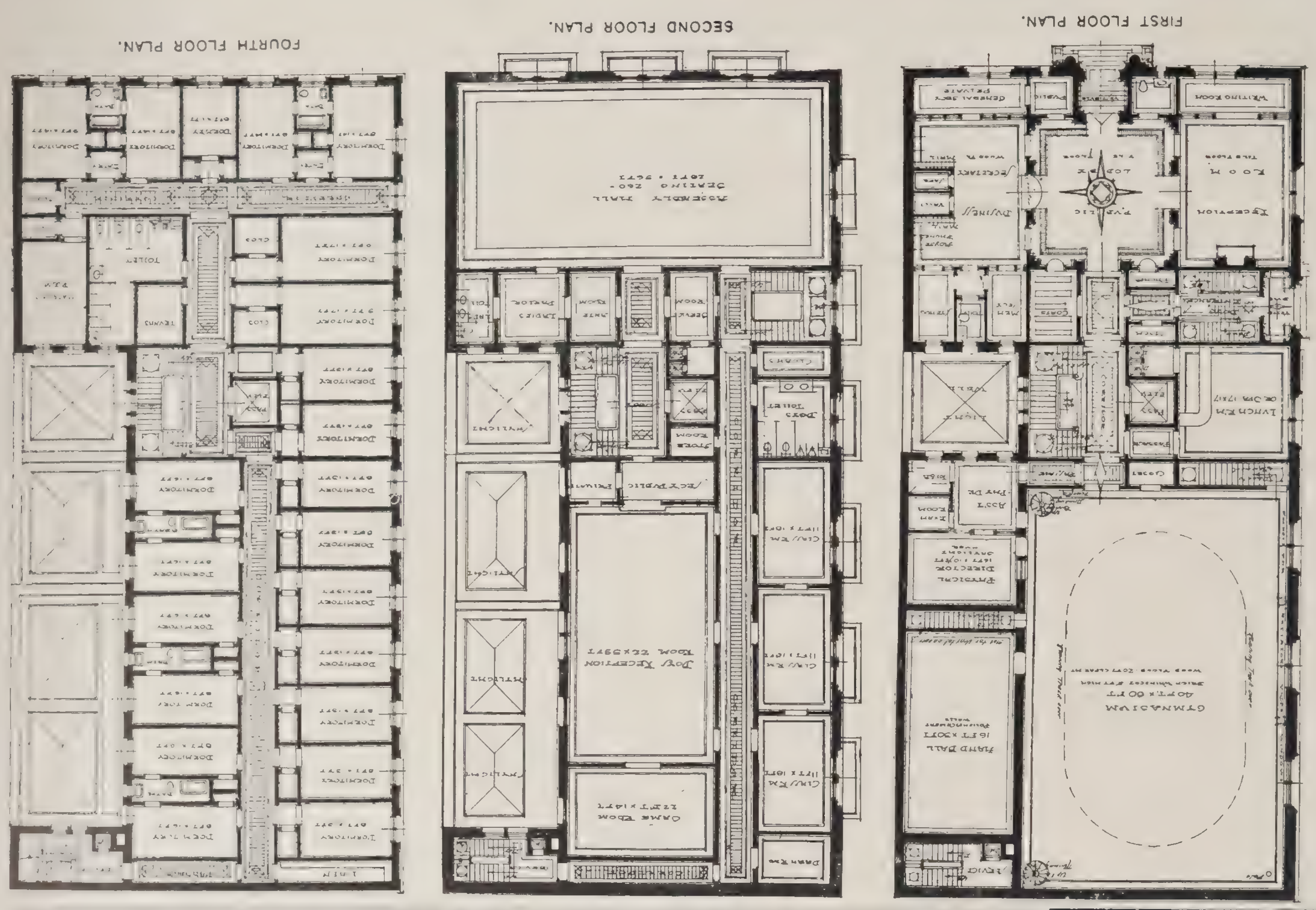
CHARLES BARTON KEEN, ARCHITECT.

HOUSE AT OVERBROOK, PENNSYLVANIA.
CHARLES BARTON KEEN, ARCHITECT.



THE NEW YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, MARBLEHEAD, MASS.

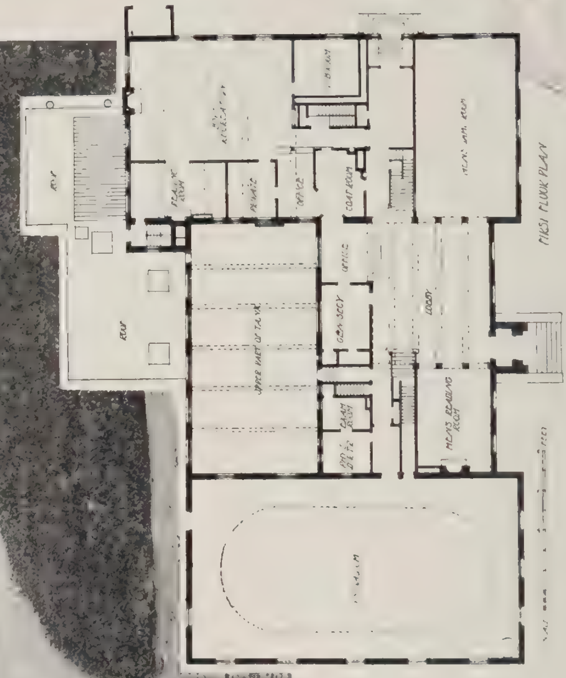
NEWHALL & BLEVINS, ARCHITECTS.

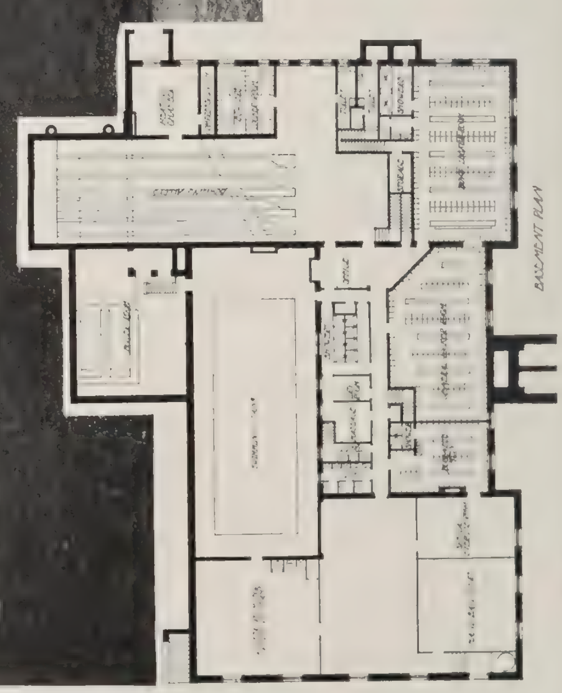


YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING,
NORFOLK, VA

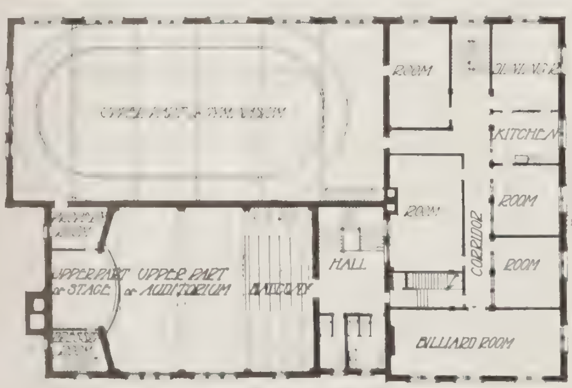
R E MITCHELL AND WOOD, DONN & DEMING, ASSOCIATED ARCHITECTS.

DETAILS OF YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, NORFOLK, VA.
R. E. MITCHELL AND WOOD, DONN & DEMING, ASSOCIATED ARCHITECTS

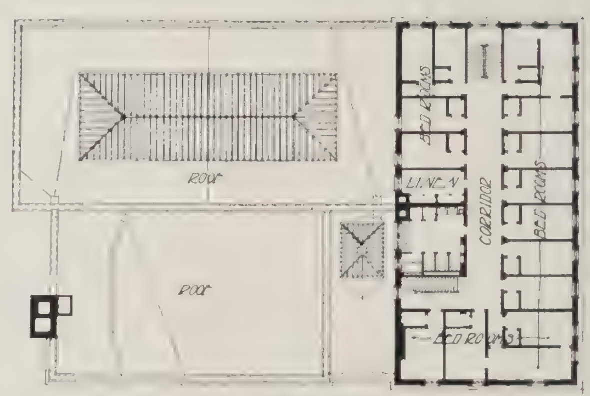




YOUNG MEN'S
CHRISTIAN ASSOCIATION BUILDING,
NEWTON, MASS.
BRAINERD & LEEDS, ARCHITECTS



SECOND FLOOR PLAN

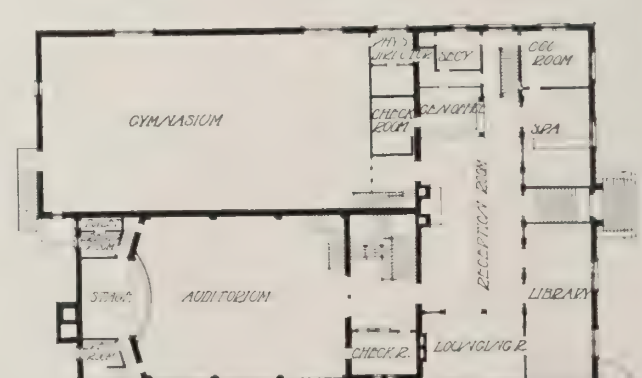


THIRD FLOOR PLAN

HYDE PARK
YOUNG
MEN'S CHRISTIAN
ASSOCIATION
BUILDING,
CHICAGO, ILL.

FROST & GRANGER,
ARCHITECTS

BASEMENT PLAN



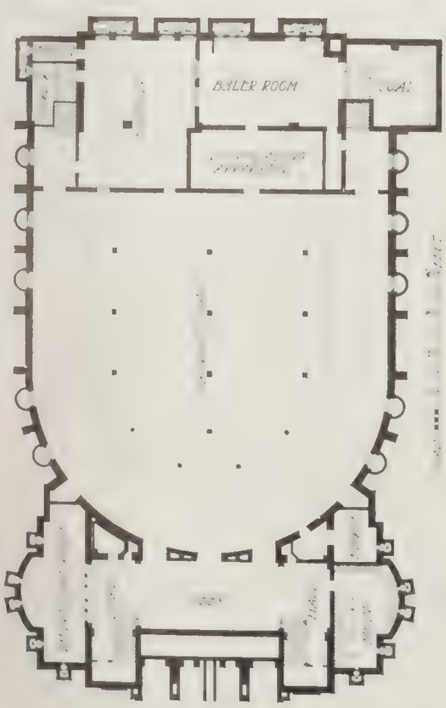
FIRST FLOOR PLAN

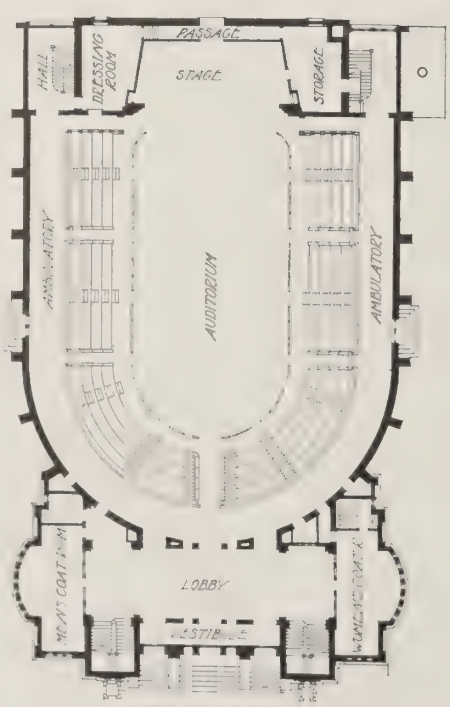
LOBBY

ENTRANCE.

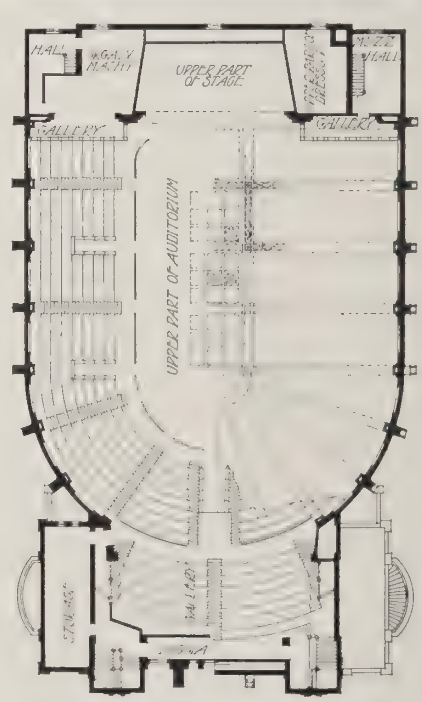
MOHAMMED TEMPLE, PEORIA, ILL.

HERBERT EDMUND HEWITT AND HEWITT & EMERSON, ARCHITECTS.





MAIN FLOOR PLAN

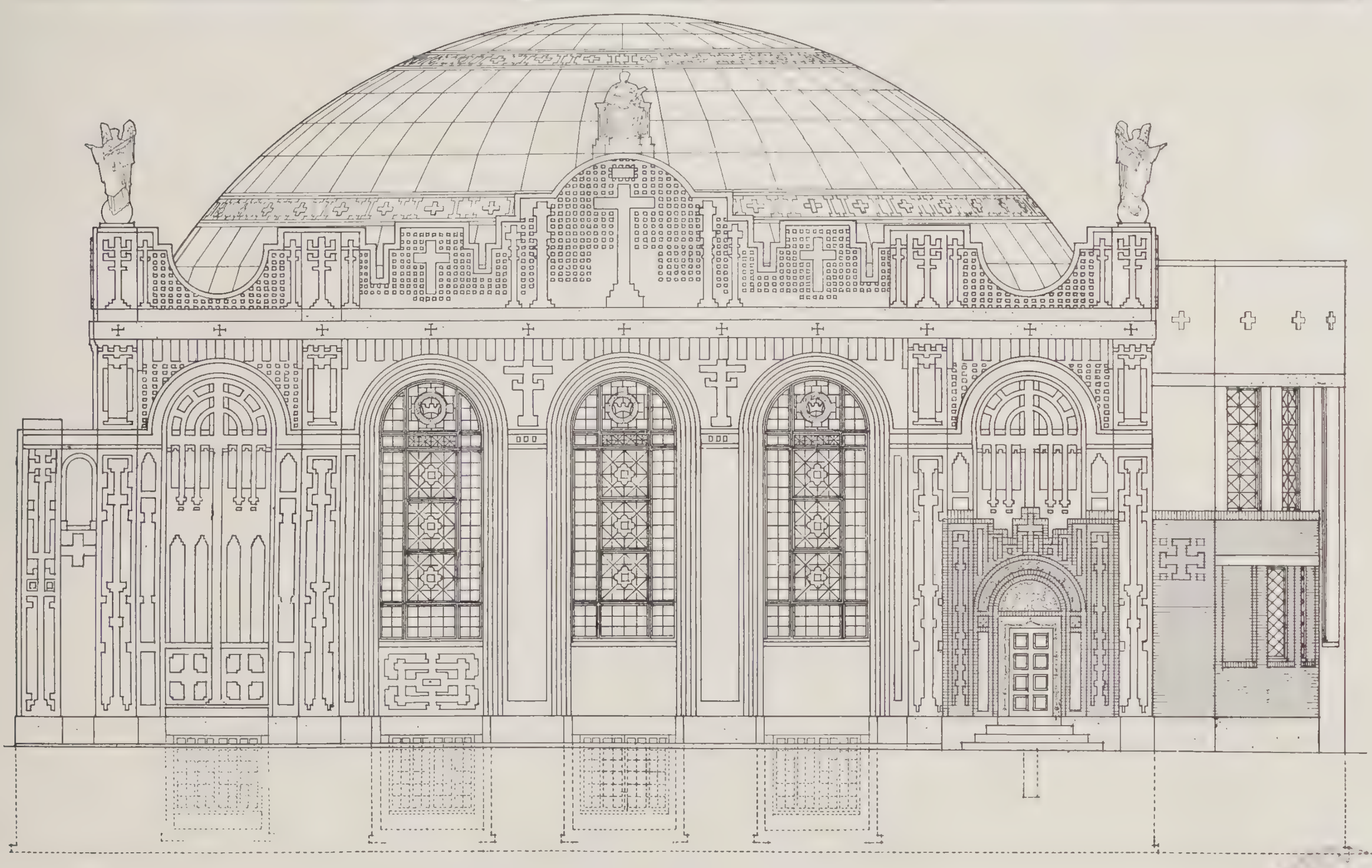


1/2 PLAN AT INTERMEDIATE LEVEL

1/2 PLAN AT UPPER LEVEL

MOHAMMED TEMPLE, PEORIA, ILL

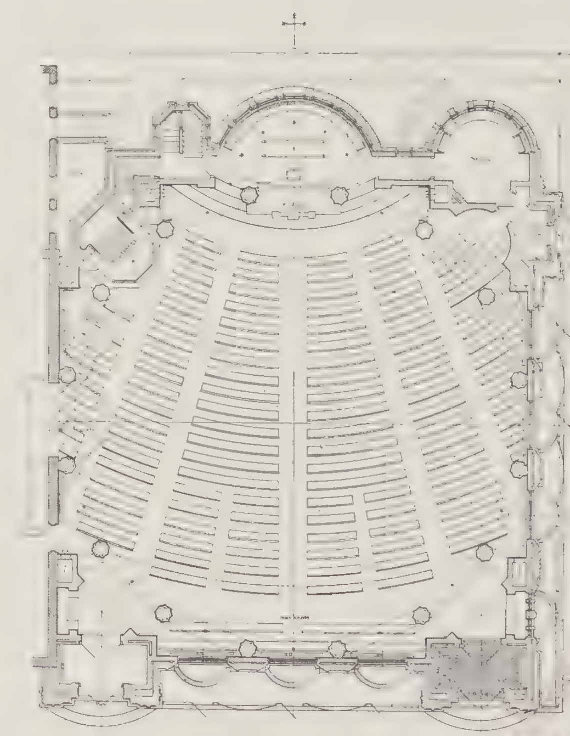
HERBERT EDMUND HEWITT AND HEWITT & EMERSON, ARCHITECTS.



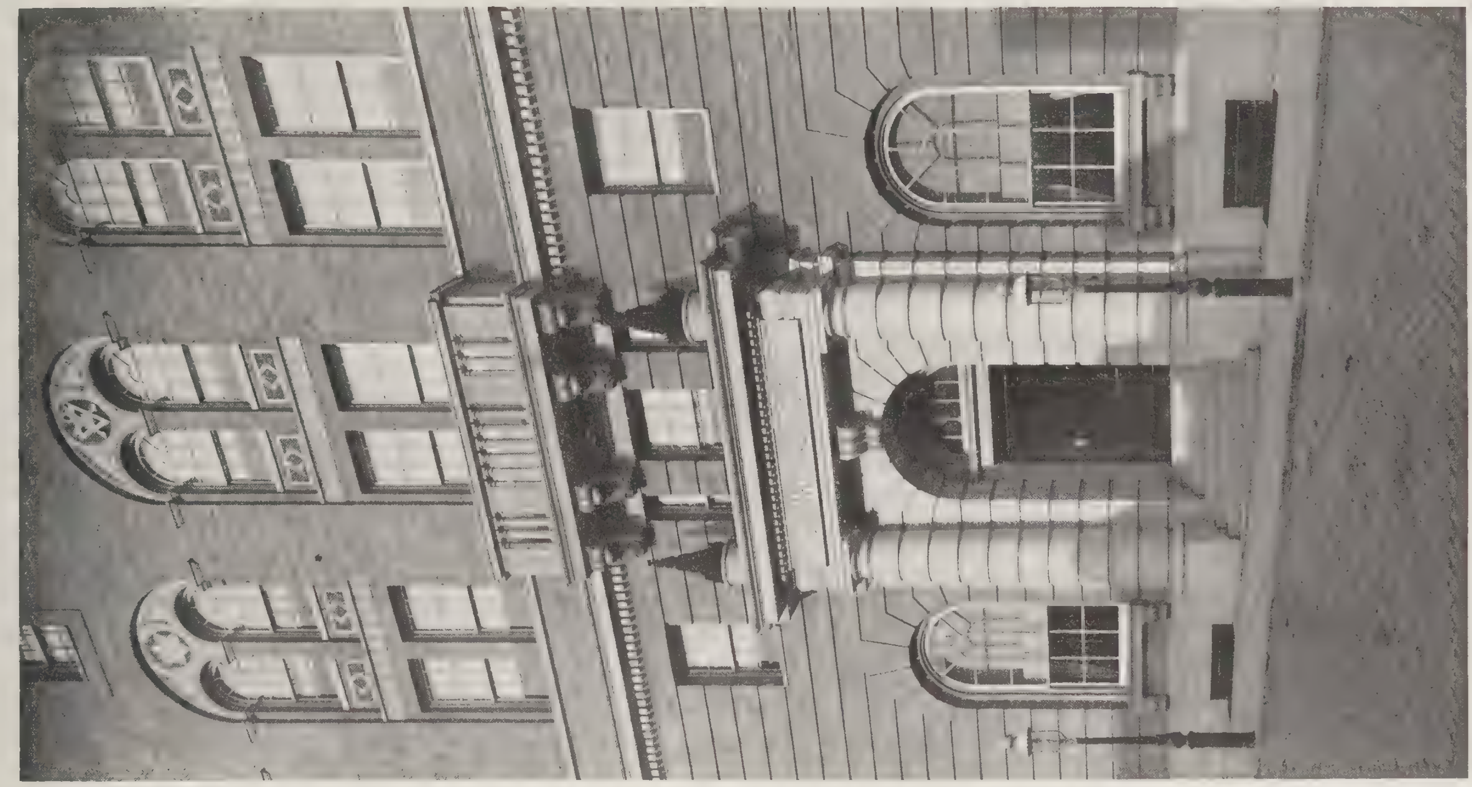
LINDEN BAPTIST CHURCH, CAMDEN, N. J.
ARTHUR TRUSCOTT AND ARNOLD H MOSES, ASSOCIATED ARCHITECTS.

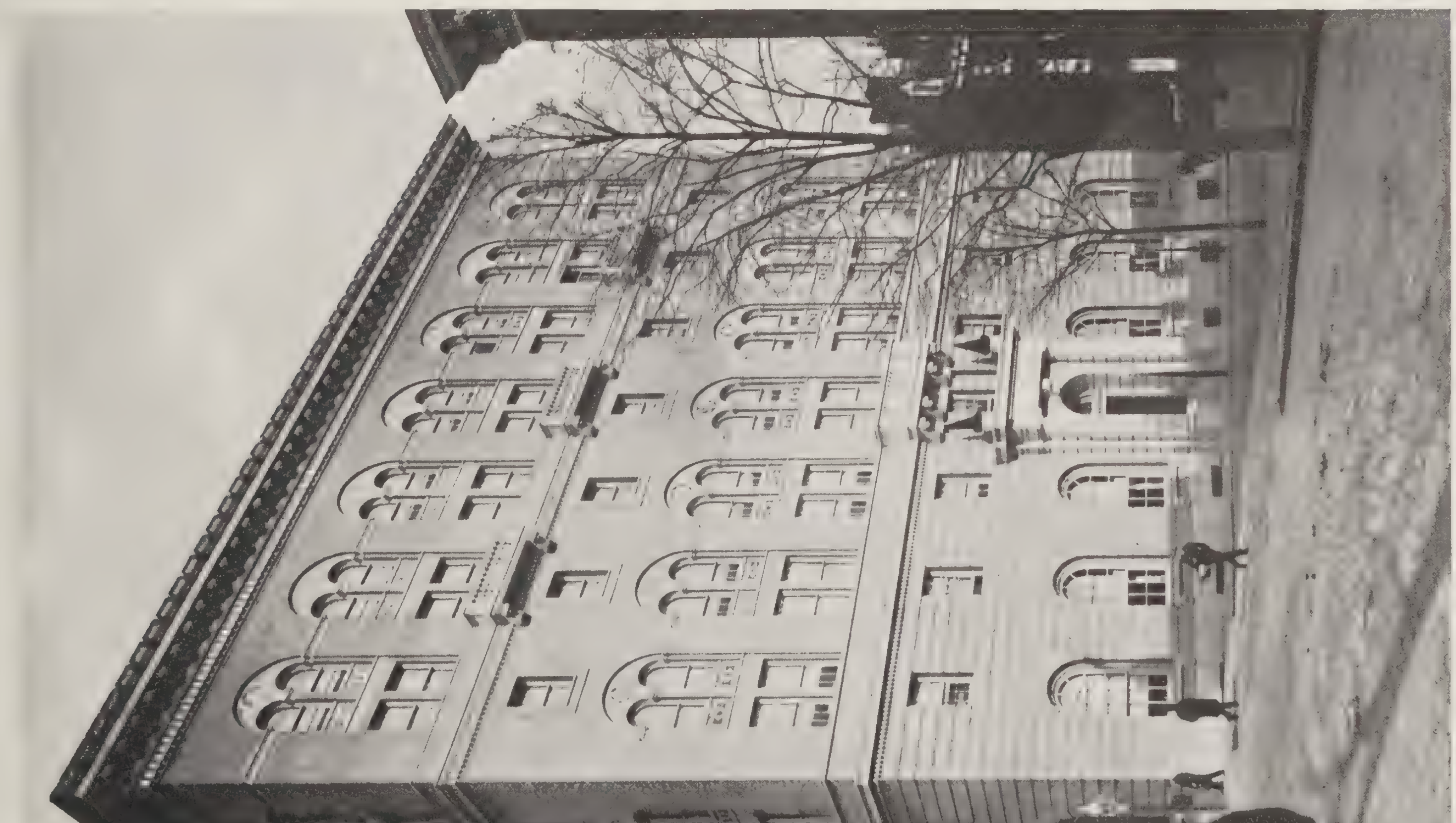
LINDEN BAPTIST CHURCH,
CAMDEN, N. J.

ARTHUR TRUSCOTT
AND
ARNOLD H MOSES,
ASSOCIATED
ARCHITECTS.



MAIN FLOOR PLAN.



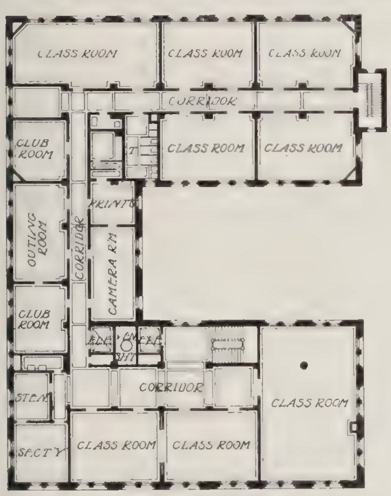


YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, BALTIMORE, MD.

JOSEPH EVANS SPERRY, ARCHITECT

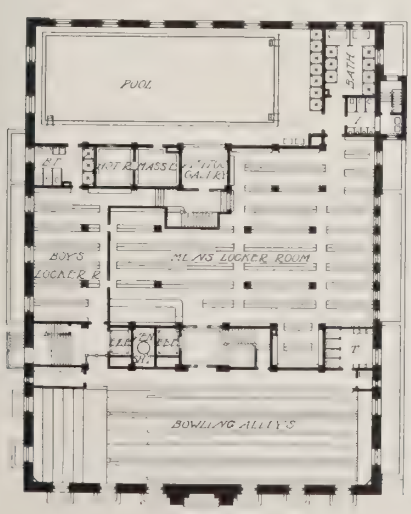
YOUNG MEN'S
CHRISTIAN ASSOCIATION BUILDING,
BALTIMORE, MD.

JOSEPH EVANS SPERRY, ARCHITECT

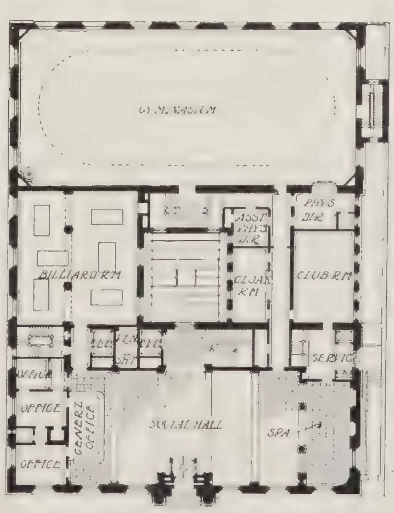


FOURTH FLOOR PLAN

FIFTH FLOOR PLAN



BASEMENT PLAN



FIRST FLOOR PLAN SCALE 0 5 10 20 30 FEET

SECOND FLOOR PLAN

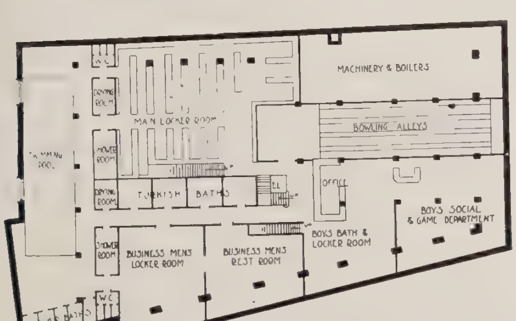
THIRD FLOOR PLAN

THIRD FLOOR

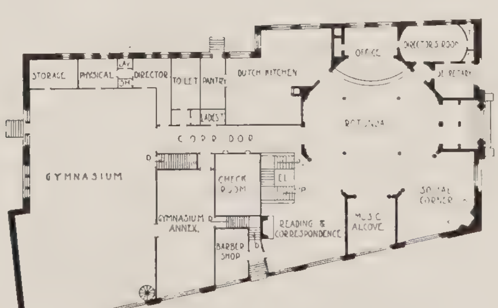
YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, SAINT PAUL, MINN.

CLARENCE H. JOHNSTON
ARCHITECT.

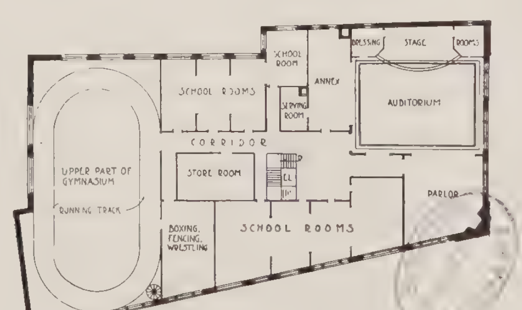
FOURTH AND FIFTH FLOORS.



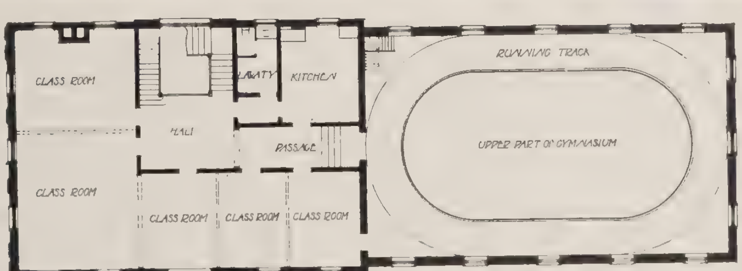
BASEMENT.



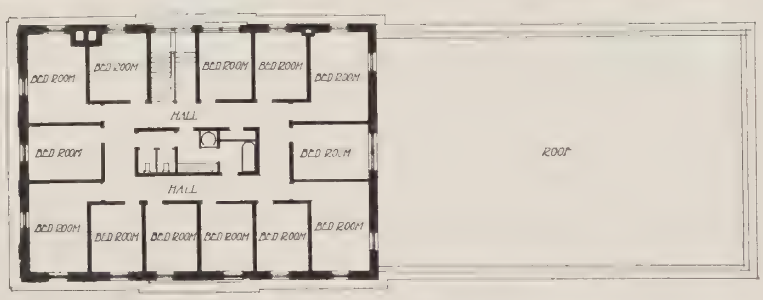
GROUND FLOOR



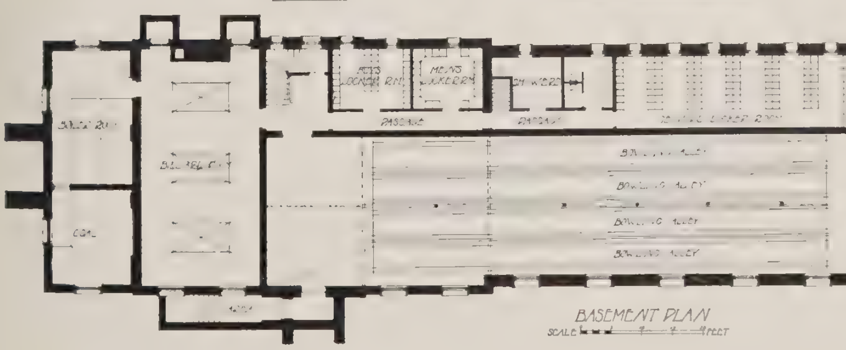
SECOND FLOOR.



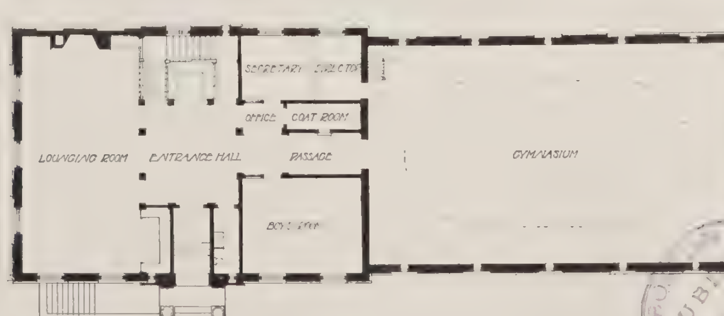
SECOND FLOOR PLAN



THIRD FLOOR PLAN



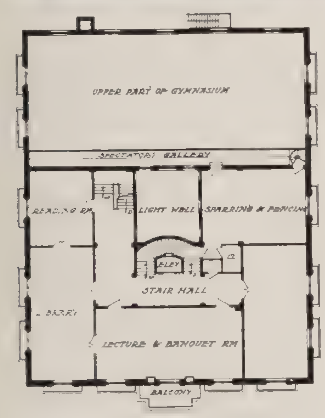
BASEMENT PLAN



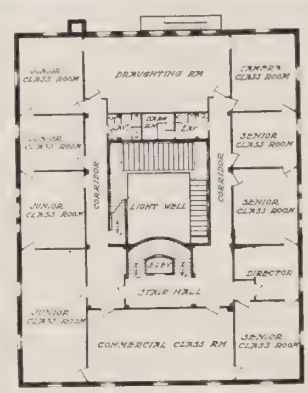
FIRST FLOOR PLAN

YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING, WHITE PLAINS, N. Y.

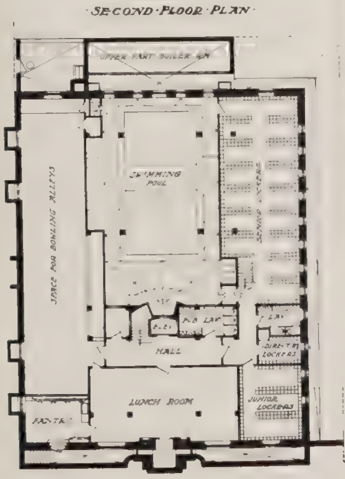
ALBRO & LINDEBERG, ARCHITECTS.



SECOND FLOOR PLAN



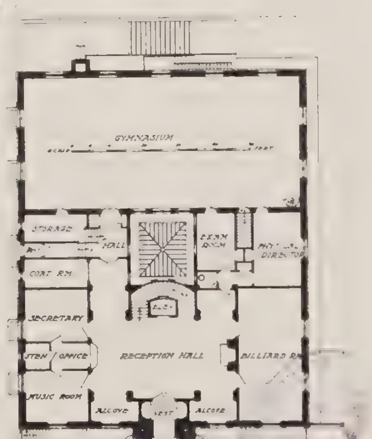
THIRD FLOOR PLAN



BASEMENT PLAN

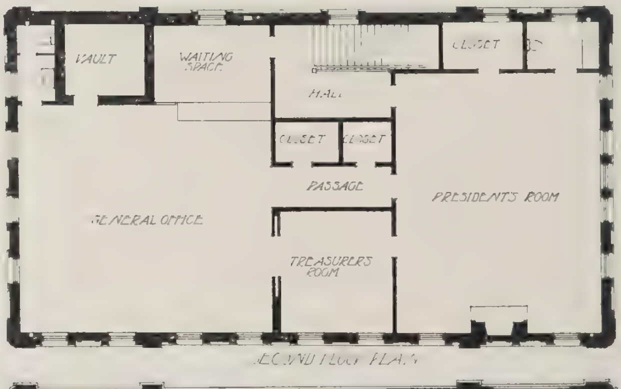
THE NEW
YOUNG MEN'S CHRISTIAN ASSOCIATION BUILDING,
WILMINGTON, DEL.

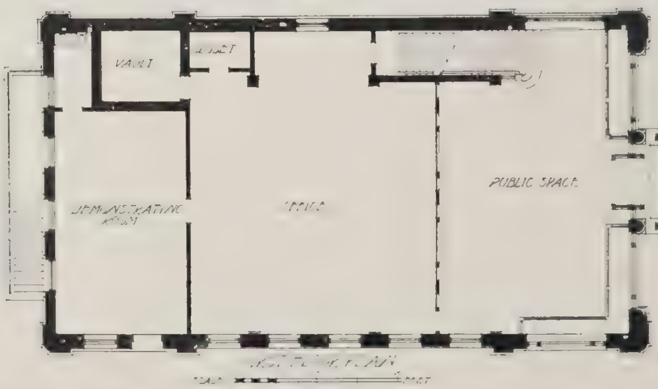
FRANK MILES DAY & BROTHER, ARCHITECTS.

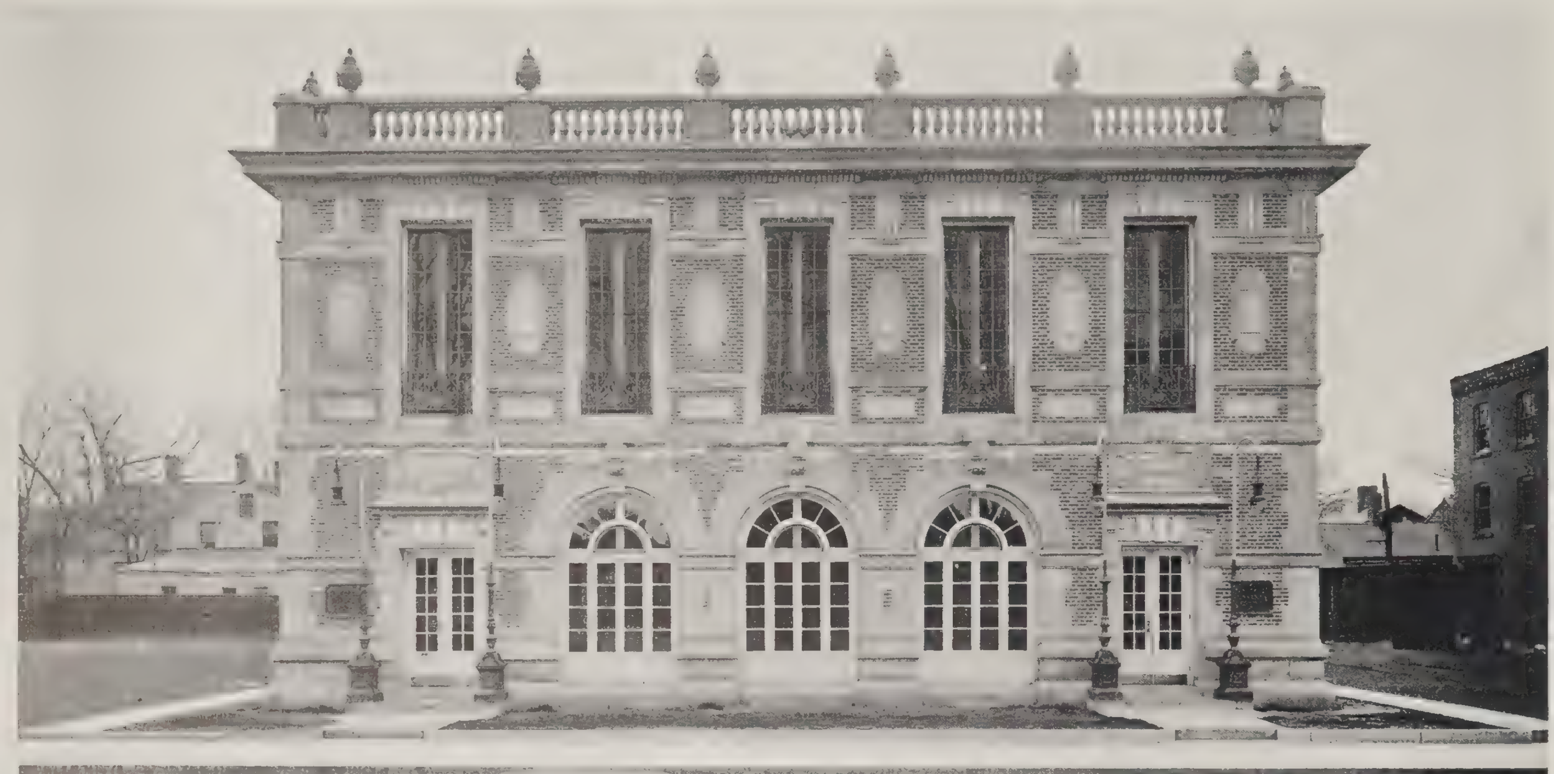


FIRST FLOOR PLAN

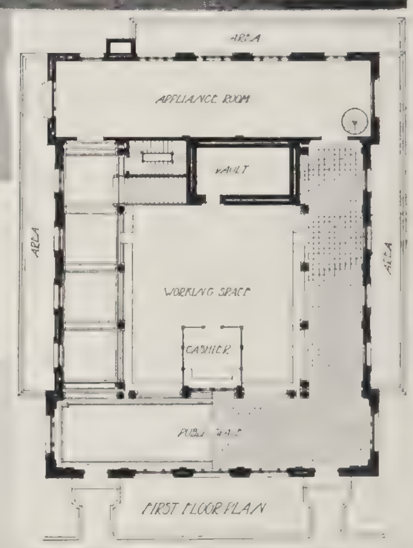
THE UNITED ILLUMINATING COMPANY BUILDING,
NEW HAVEN, CONN.
FOOTE & TOWNSEND, ARCHITECTS.





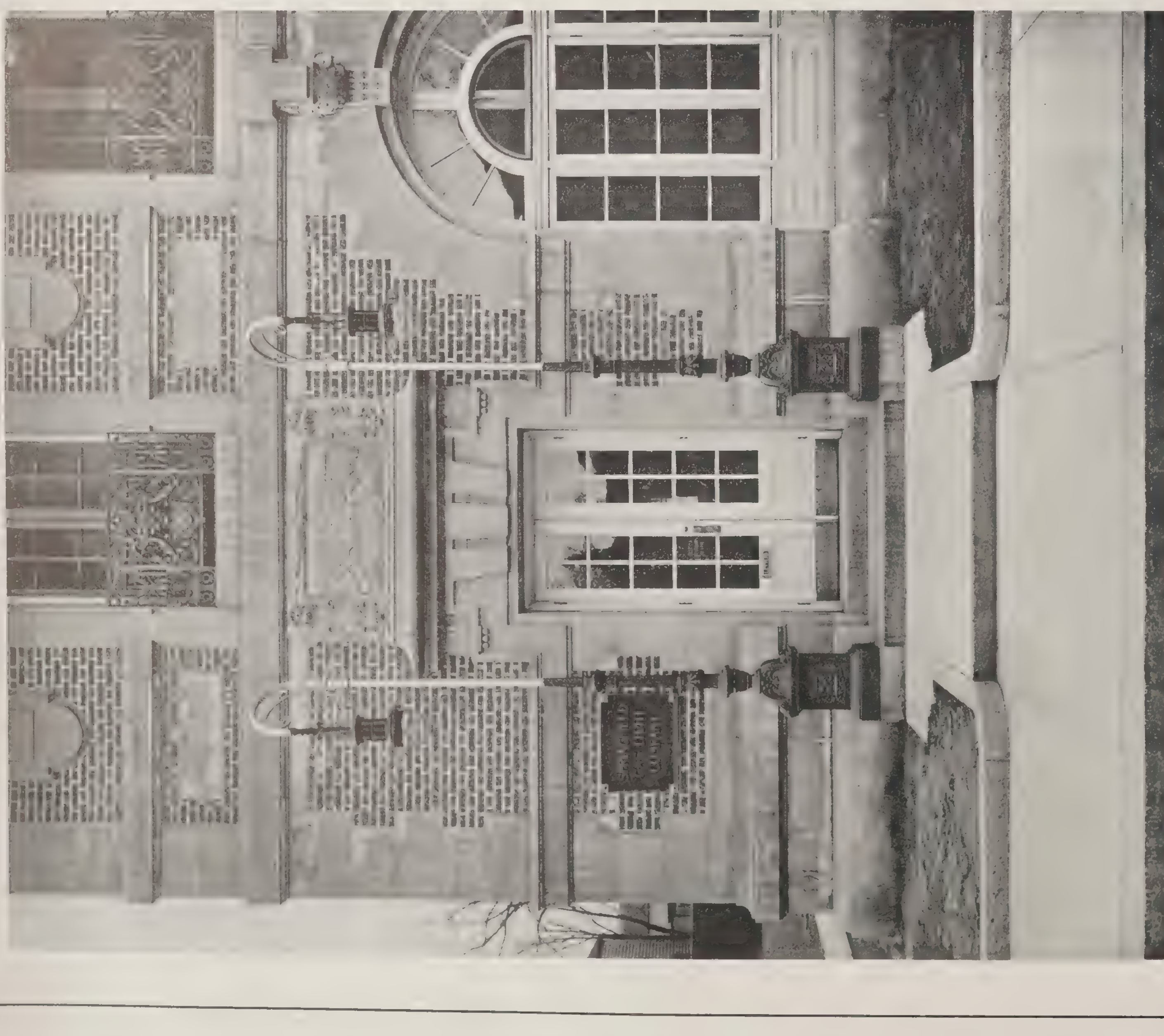


SPRINGFIELD GAS LIGHT COMPANY BUILDING,
SPRINGFIELD, MASS.
BIGELOW & WADSWORTH, ARCHITECTS.



VIEW FROM SECOND FLOOR BALCONY.

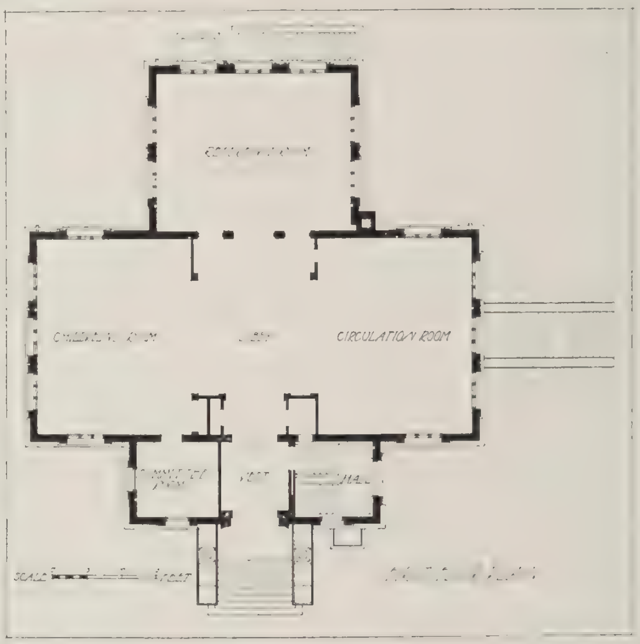
VIEW FROM PUBLIC CORRIDOR.



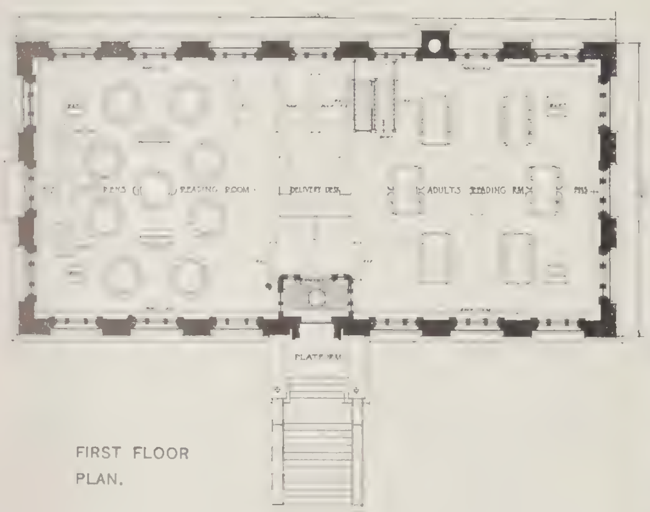
DETAIL OF ENTRANCE.

SPRINGFIELD GAS LIGHT COMPANY BUILDING, SPRINGFIELD, MASS.

BIGELOW & WADSWORTH, ARCHITECTS.

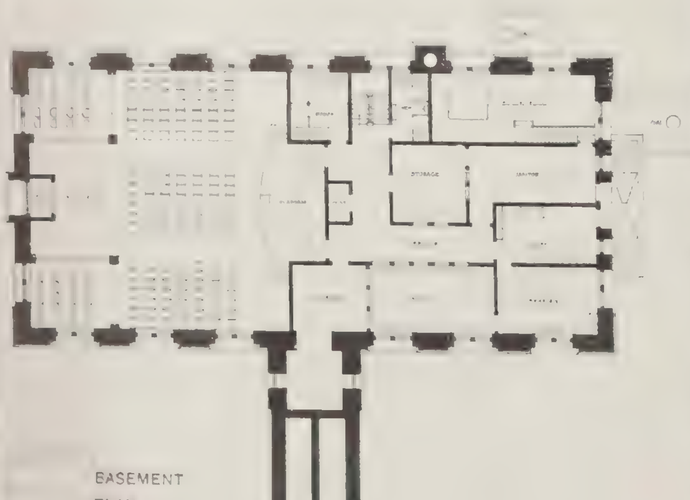


PRICE HILL PUBLIC LIBRARY, CINCINNATI, OHIO.
GARBER & WOODWARD, ARCHITECTS.

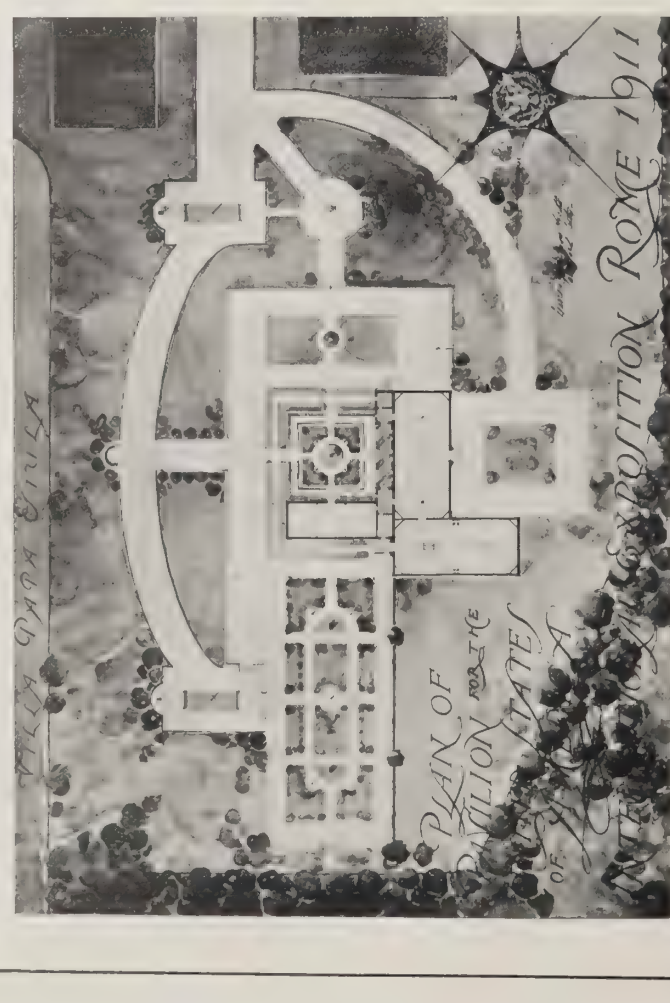


FIRST FLOOR PLAN.

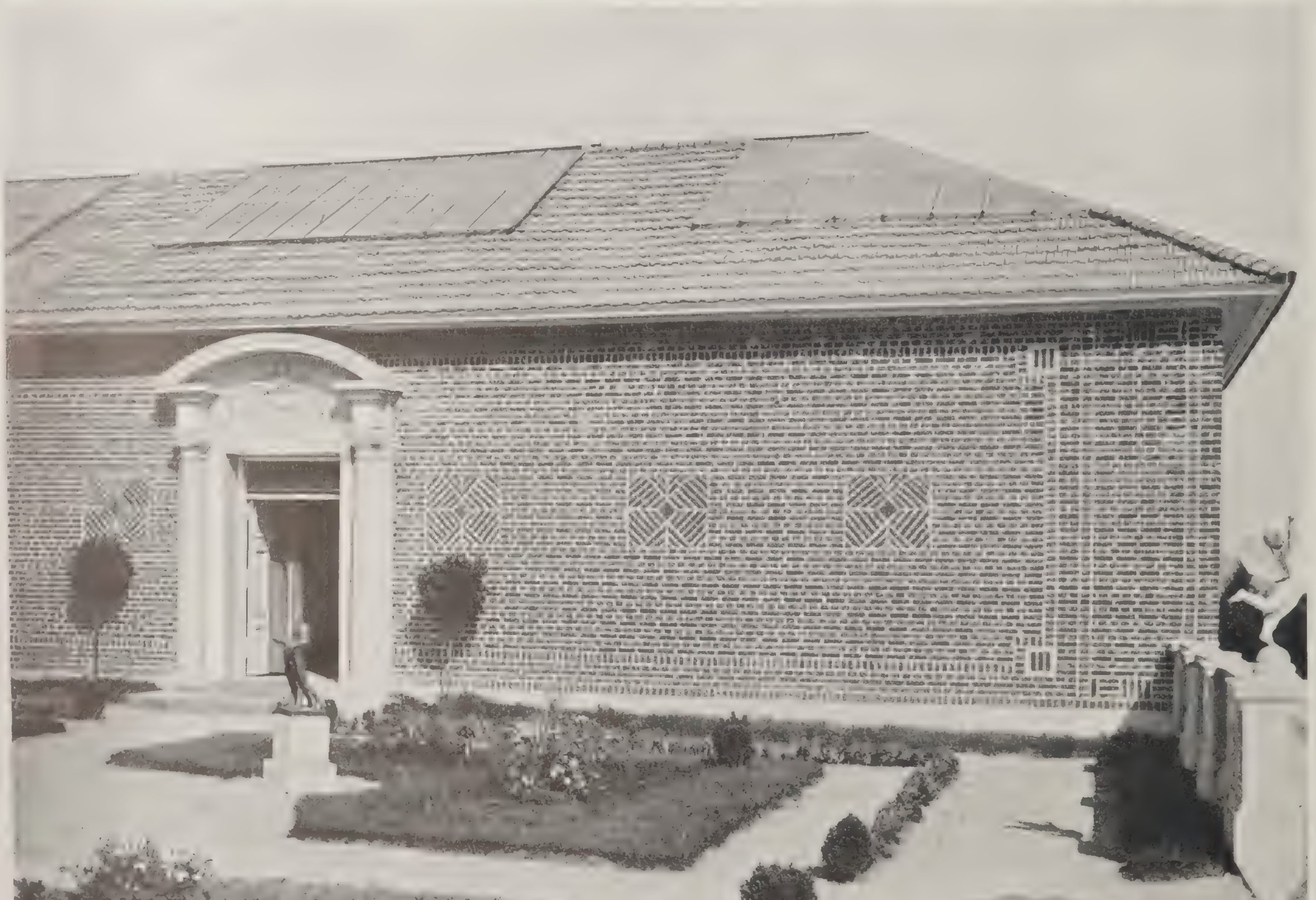
DIVOLL BRANCH LIBRARY,
ST. LOUIS, MO.
MARINER & LaBEAUME, ARCHITECTS.



BASEMENT PLAN.



AMERICAN PAVILION AT THE INTERNATIONAL EXPOSITION, ROME, ITALY.
CARRÈRE & HASTINGS, ARCHITECTS.



AMERICAN PAVILION AT THE INTERNATIONAL EXPOSITION, ROME, ITALY.
CARRÈRE & HASTINGS, ARCHITECTS.

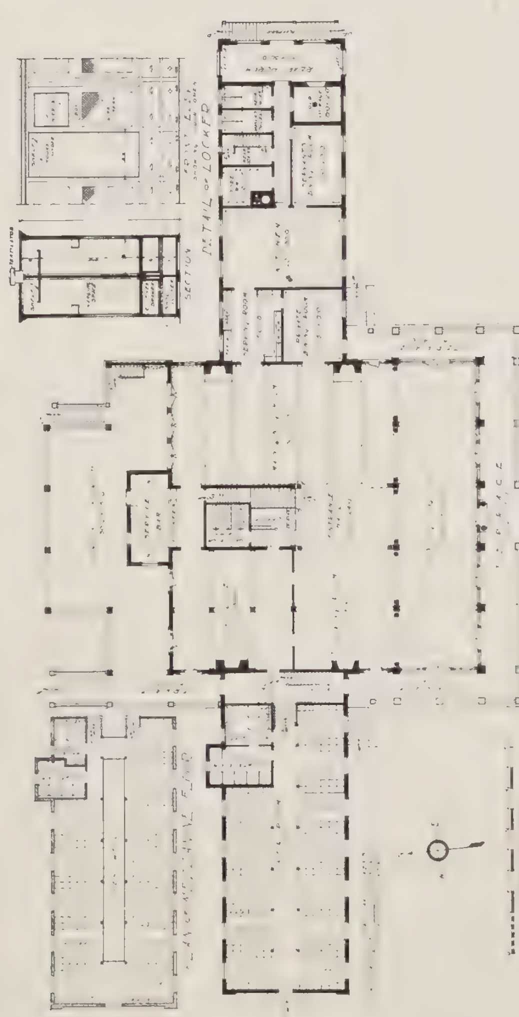
AMERICAN PAVILION AT THE INTERNATIONAL EXPOSITION, ROME, ITALY.

CARRÈRE & HASTINGS, ARCHITECTS.

THE BELLERIVE CLUB, ST. LOUIS, MO.
EDWARD G. GARDEN, ARCHITECT.

DETAIL OF TERRACE ELEVATION.

LOCKER ROOM.

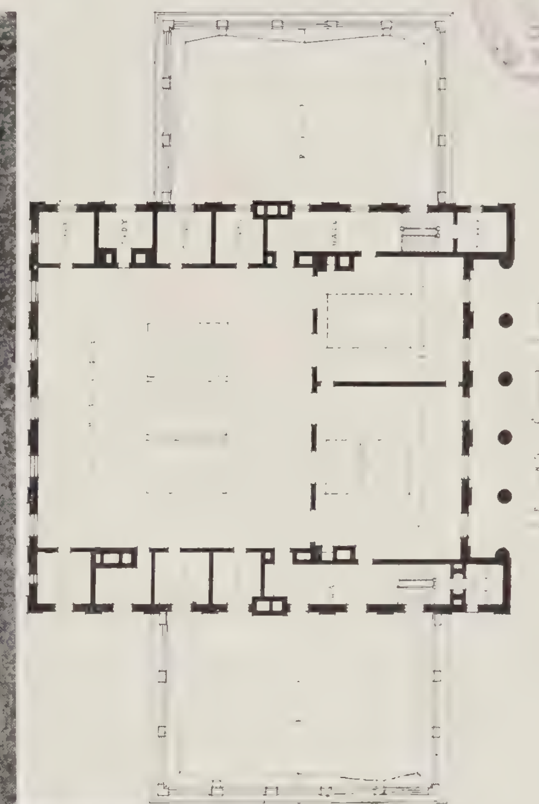


FIRST FLOOR PLAN.

SECOND FLOOR PLAN.

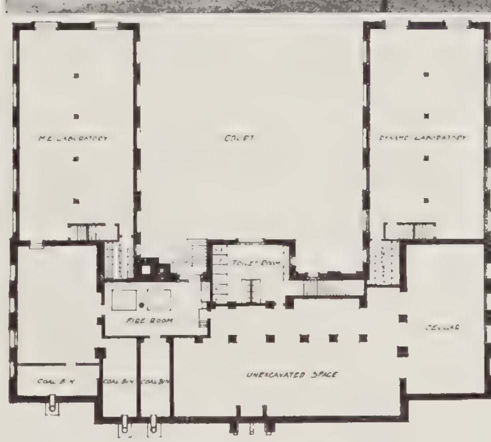
THE BELLERIVE CLUB, ST. LOUIS, MO.

EDWARD G. GARDEN, ARCHITECT.

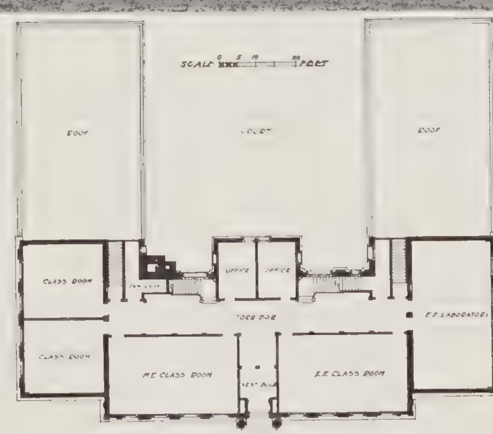


LAW BUILDING,
UNIVERSITY OF VIRGINIA,
CHARLOTTESVILLE, VA.
JOHN KEVAN PEEBLES, ARCHITECT.

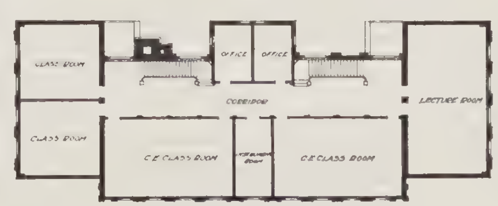
ENGINEERING BUILDING, RUTGERS COLLEGE,
NEW BRUNSWICK, N. J.
D. D. WILLIAMSON AND HILL & STOUT, ASSOCIATED ARCHITECTS.



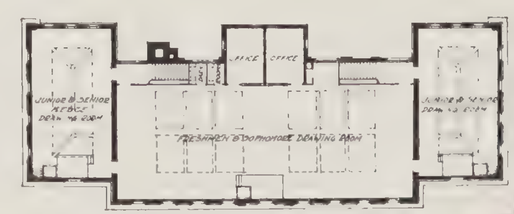
BASEMENT FLOOR PLAN.



FIRST FLOOR PLAN.



SECOND FLOOR PLAN.

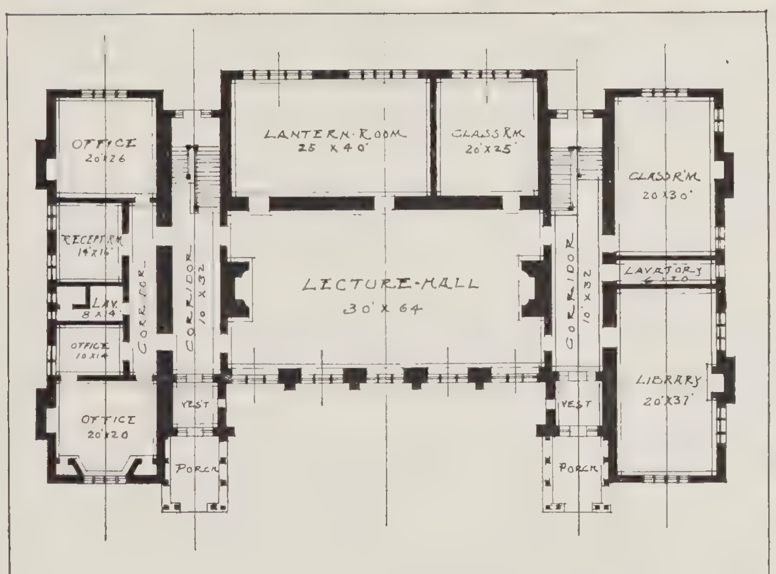


THIRD FLOOR PLAN.

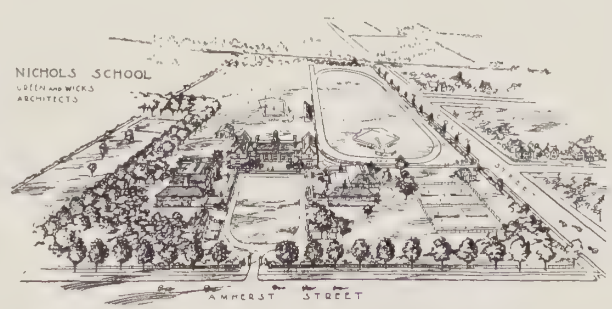
NICHOLS SCHOOL BUILDING, BUFFALO, N. Y.
GREEN & WICKS, ARCHITECTS.

NICHOLS SCHOOL BUILDING, BUFFALO, N. Y.

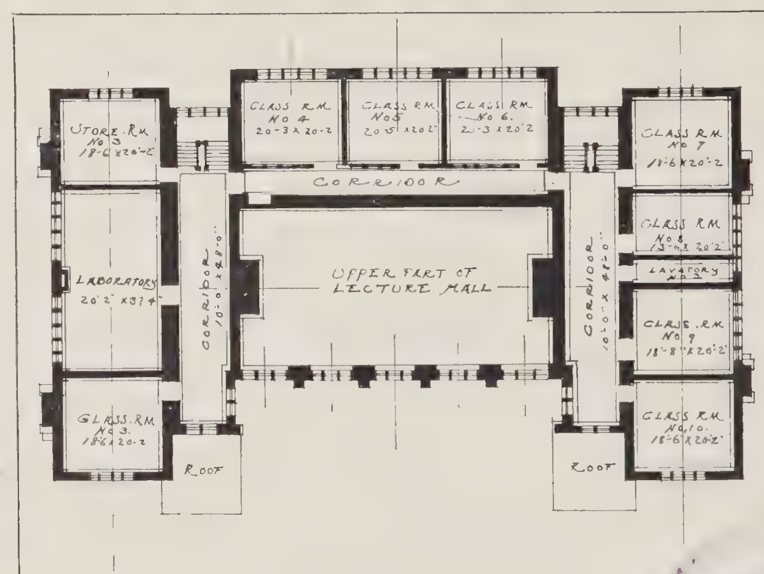
GREEN & WICKS, ARCHITECTS.



FIRST FLOOR PLAN.



BIRD'S EYE VIEW.

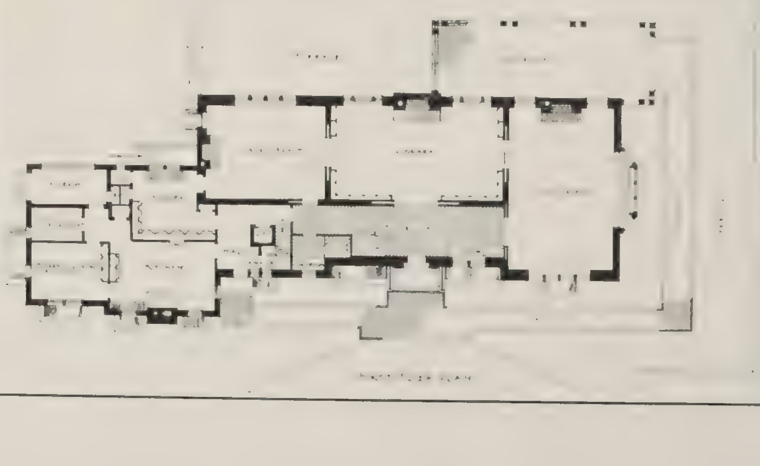


SECOND FLOOR PLAN.

HOUSE AT NEW HAVEN, CONN.
GROSVENOR ATTERBURY, ARCHITECT.

HOUSE AT NEW HAVEN, CONN.
GROSVENOR ATTERBURY, ARCHITECT.

Second Floor Plan



HOUSE AT CHESTNUT HILL, PA.
BROCKIE & HASTINGS, ARCHITECTS.

GARDEN VIEWS.

HOUSE AT HUNTINGTON, LONG ISLAND, N. Y.

WILSON EYRE, ARCHITECT.

PLANS, INTERIOR AND EXTERIOR VIEWS.

HOUSE AT HUNTINGTON, LONG ISLAND, N.Y.

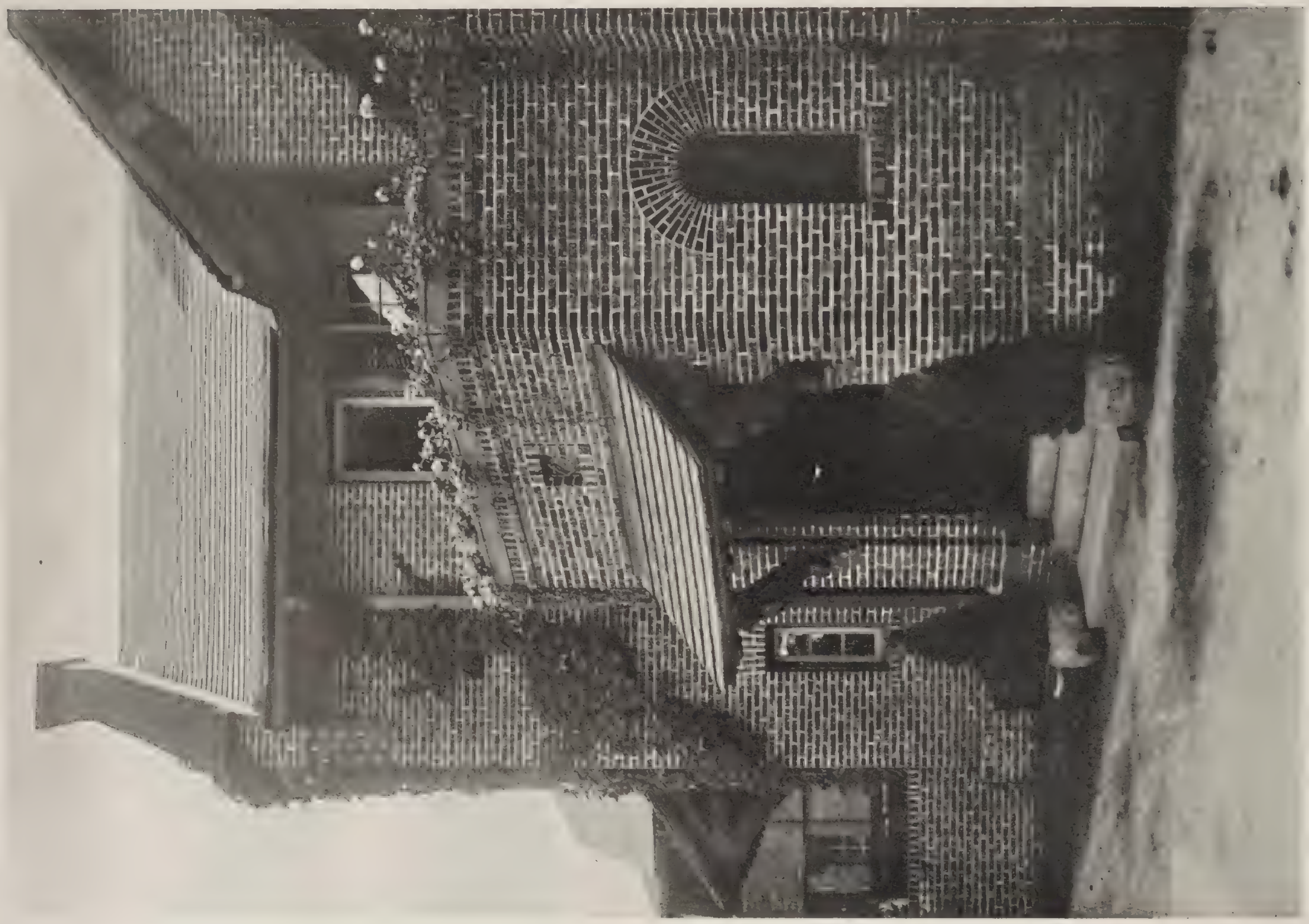
WILSON EYRE, ARCHITECT.

Second Floor Plan

First Floor Plan

MUSIC ROOM.

VOL. 20, NO. 10. PLATE 132.



EXTERIOR DETAILS.

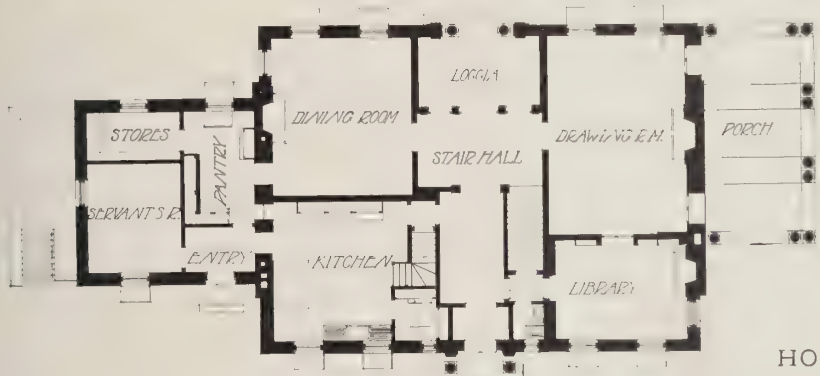
HOUSE AT HUNTINGTON, LONG ISLAND, N. Y.

WILSON EYRE, ARCHITECT.

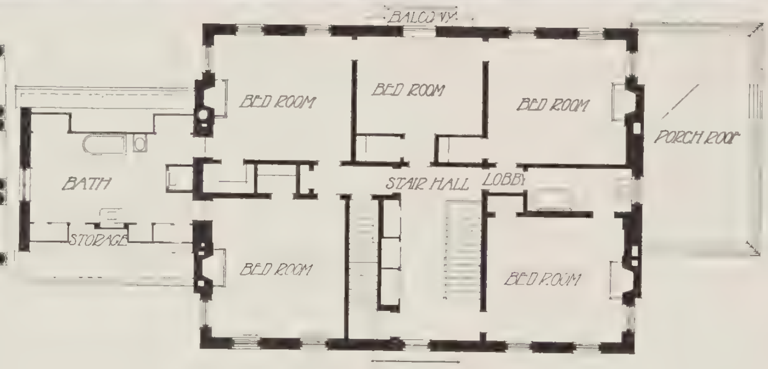
HOUSE AT HUNTINGTON, LONG ISLAND, N Y

WILSON EYRE, ARCHITECT.

HOUSE AT HARTFORD, CONN.
CHARLES A. PLATT, ARCHITECT.

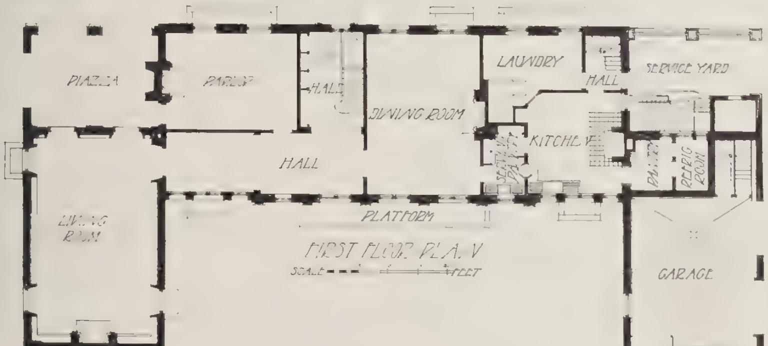


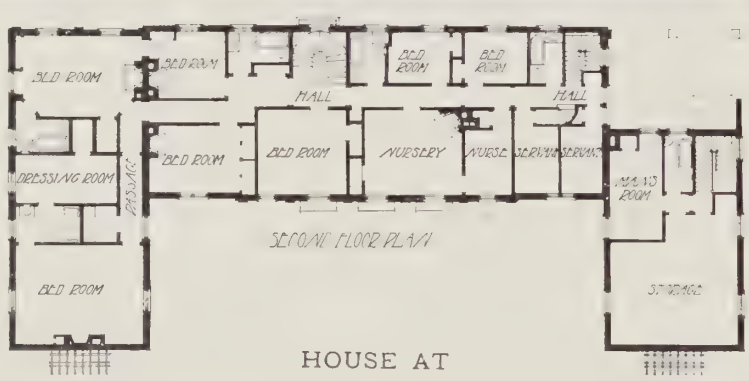
FIRST FLOOR PLAN



SECOND FLOOR PLAN

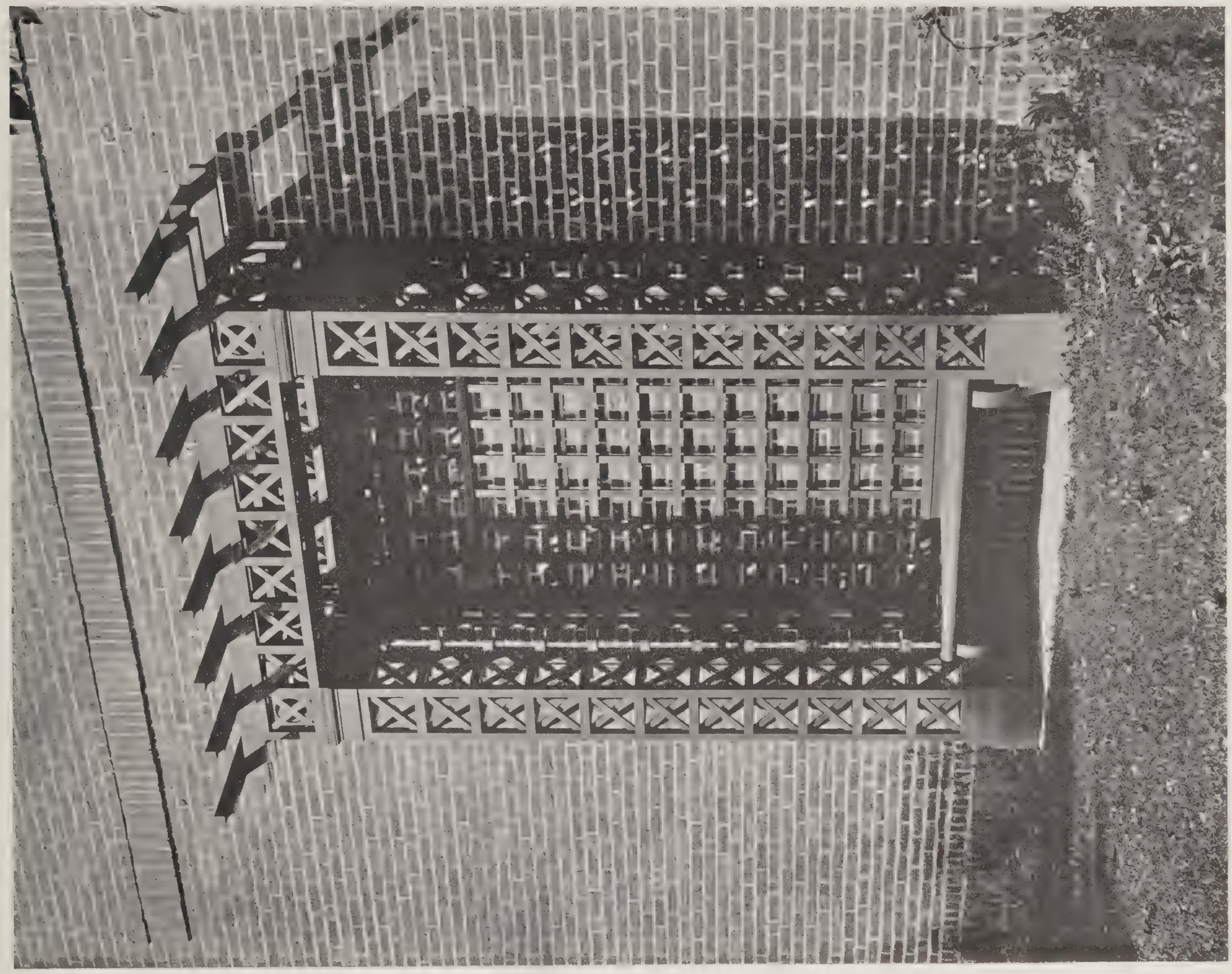
HOUSE AT
HARTFORD, CONN.
CHARLES A. PLATT, ARCHITECT.





BIGELOW & WADSWORTH,
ARCHITECTS.

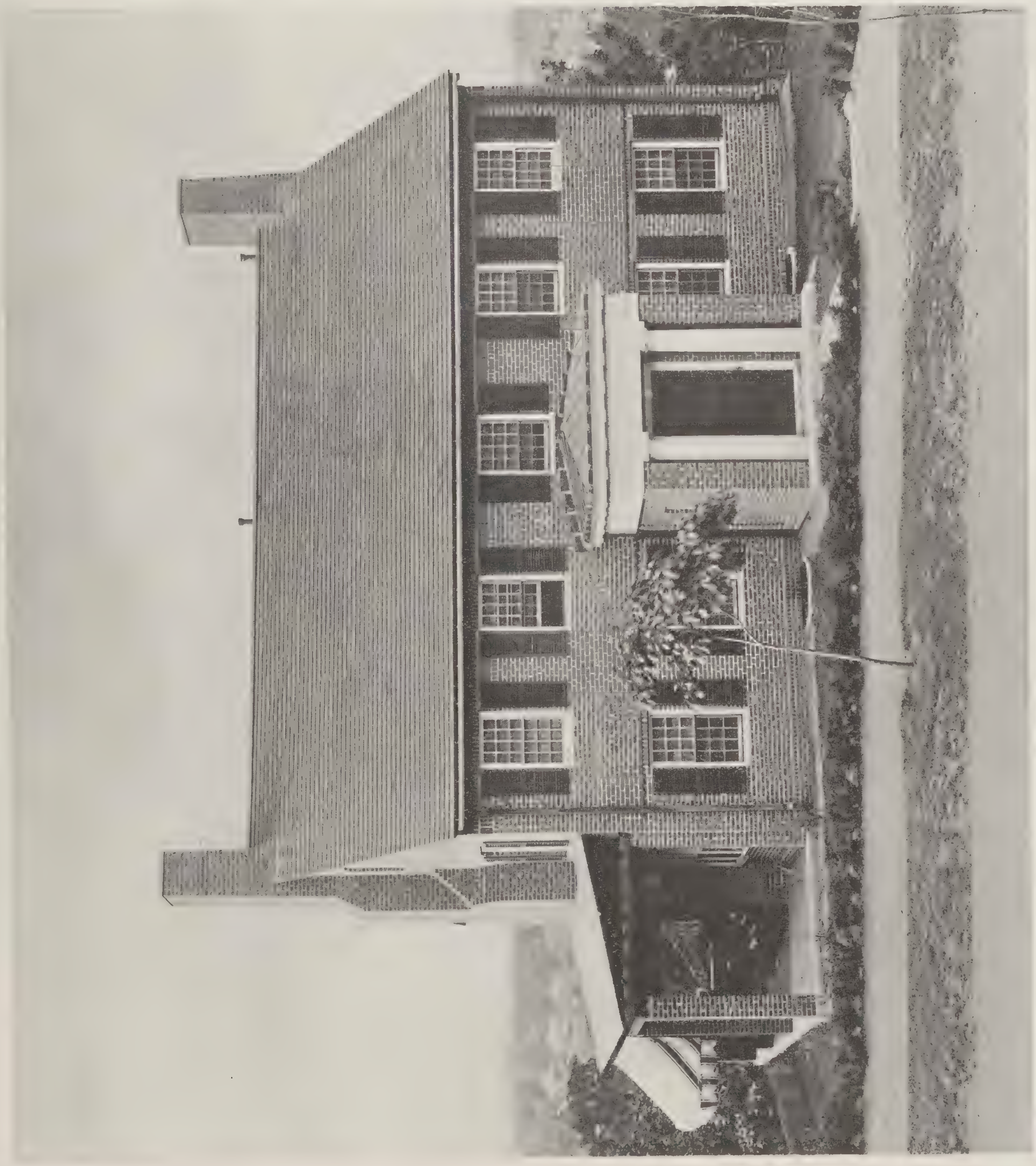
HOUSE AT
SHERBORN, MASS.



EXTERIOR AND INTERIOR VIEWS.
HOUSE AT
SHERBORN, MASSACHUSETTS.
BIGELOW & WADSWORTH, ARCHITECTS.

ABRAM GARFIELD,
ARCHITECT.

HOUSE AT CLEVELAND, OHIO.

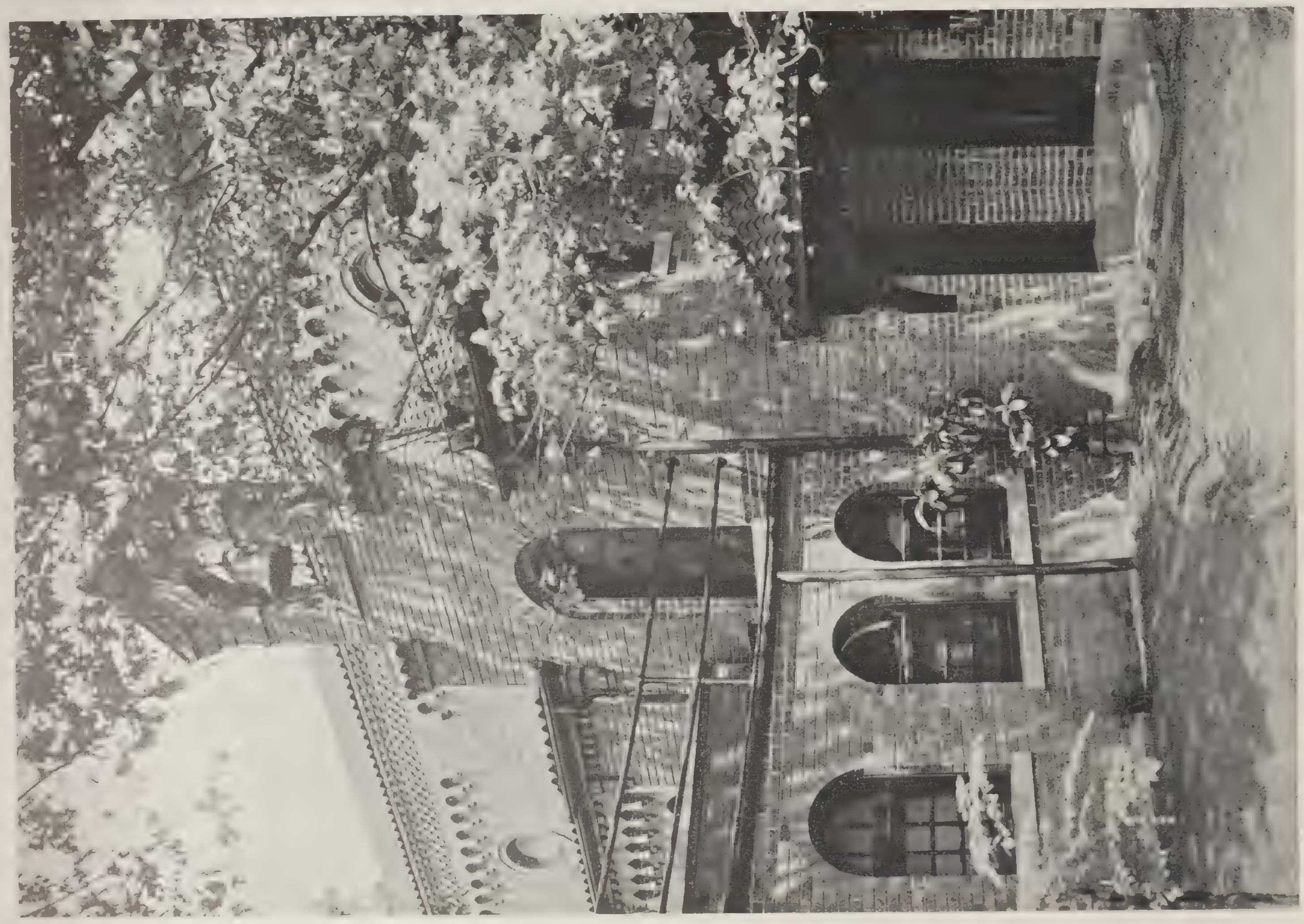


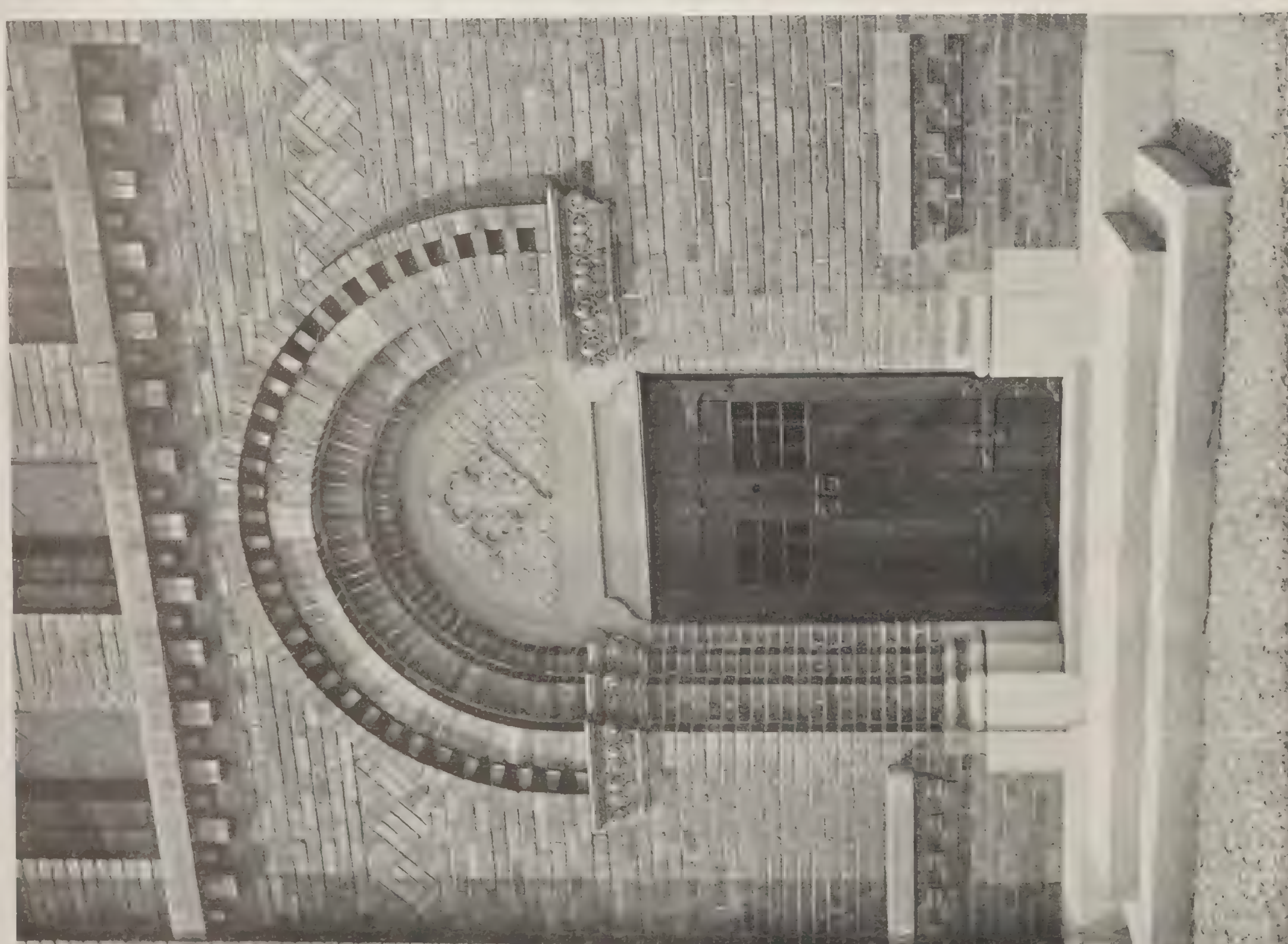
HOUSE AT BROOKLINE, MASS.
CUMMINGS & HOWARD, ARCHITECTS.

HOUSE AT CLEVELAND, OHIO.

J. MILTON DYER, ARCHITECT.

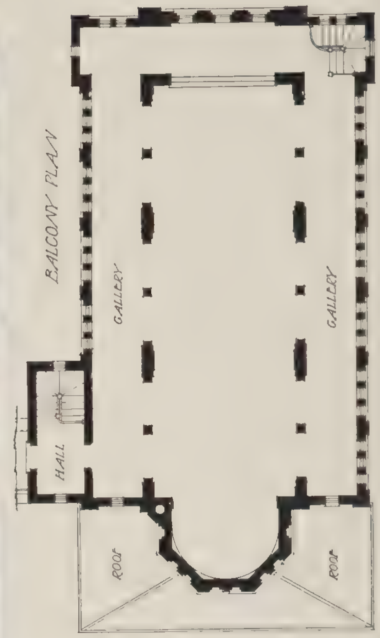
CHAPEL FOR THE LITTLE HELPERS OF THE HOLY SOULS, ST. LOUIS, MO.
MAURAN & RUSSELL, ARCHITECTS.



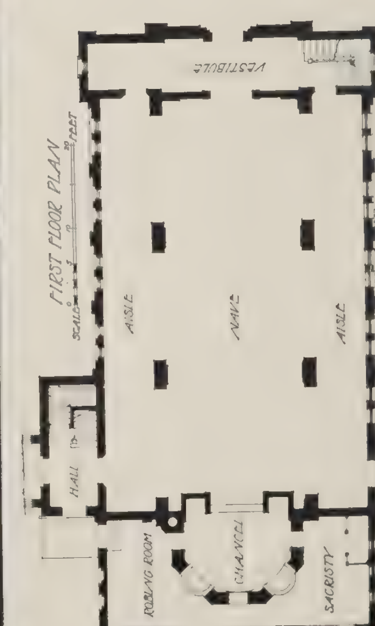


CHAPEL FOR THE LITTLE HELPERS OF THE HOLY SOULS, ST. LOUIS, MO.

MAURAN & RUSSELL ARCHITECTS.

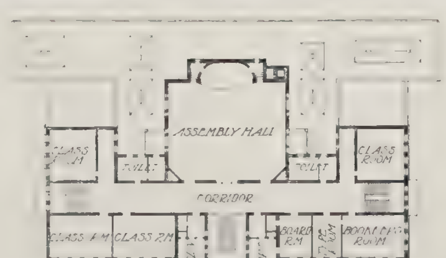


CHAPEL FOR THE LITTLE HELPERS
OF THE HOLY SOULS,
ST. LOUIS, MO.
MAURAN & RUSSELL, ARCHITECTS.



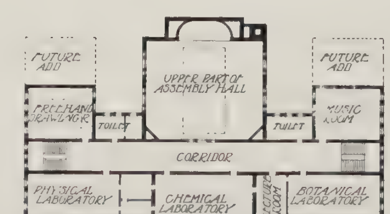
BASEMENT PLAN

MANUAL TRAINING
HIGH SCHOOL,
WHITING, INDIANA.



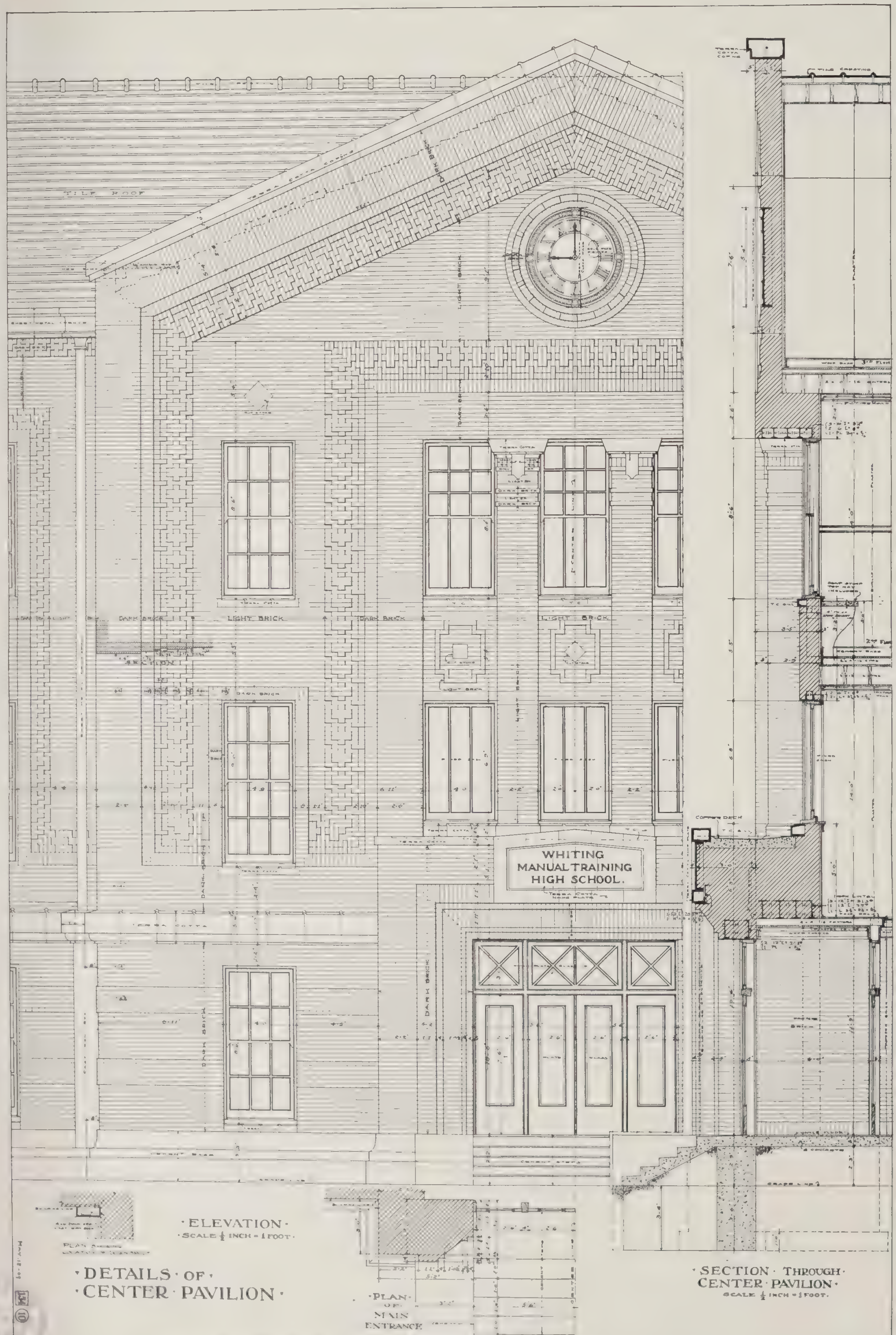
FIRST FLOOR PLAN

PERKINS & HAMILTON,
ARCHITECTS.



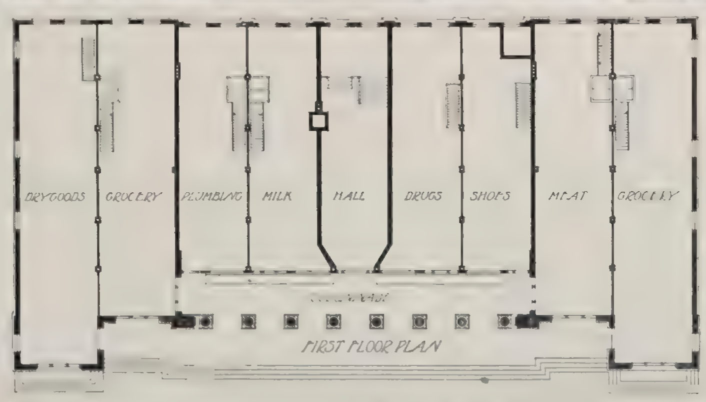
SECOND FLOOR PLAN

MANUAL TRAINING HIGH SCHOOL, WHITING, IND.
PERKINS & HAMILTON, ARCHITECTS.

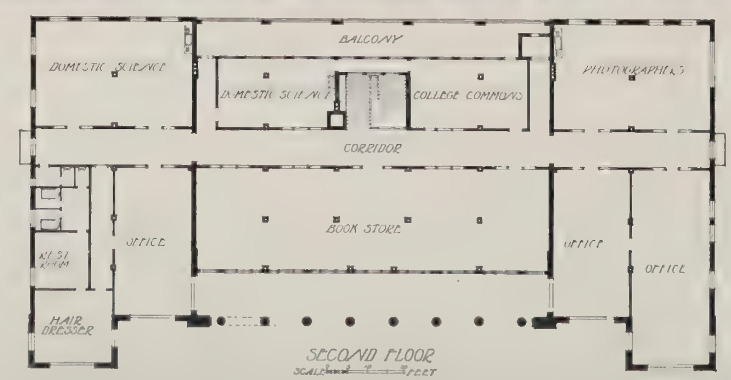


MANUAL TRAINING HIGH SCHOOL, WHITING, IND.

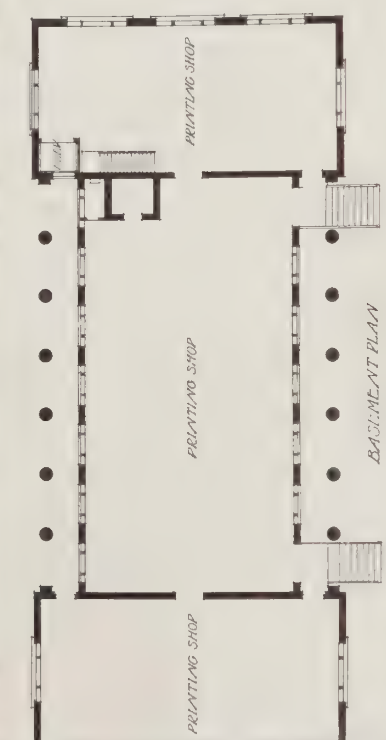
PERKINS & HAMILTON, ARCHITECTS.

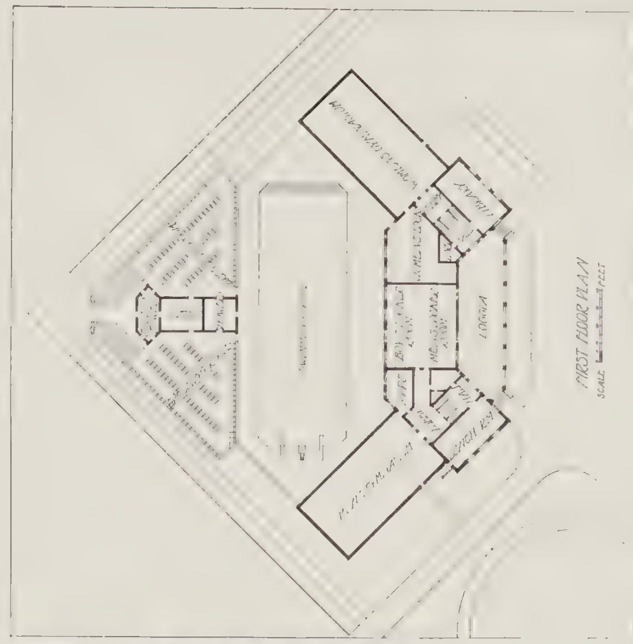


COLONNADE BUILDING,
CHAUTAUQUA, N. Y.
GREEN & WICKS, ARCHITECTS.



POST OFFICE BUILDING,
CHAUTAUQUA, N. Y.
GREEN & WICKS, ARCHITECTS.

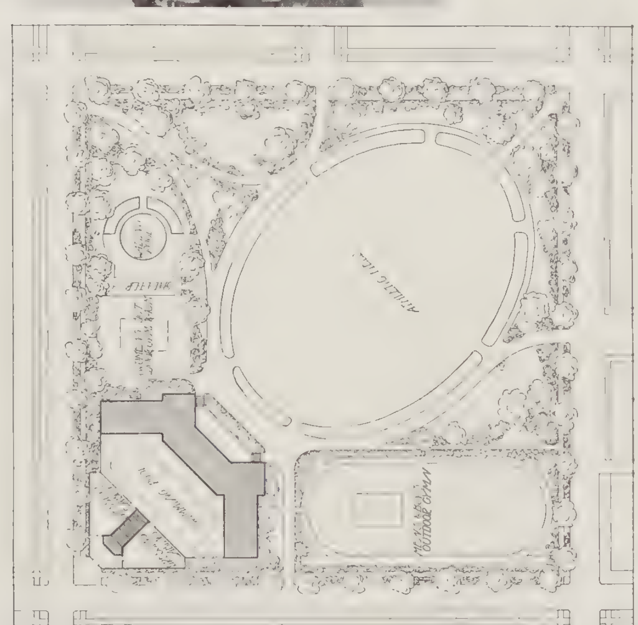




FIELD HOUSE AND GYMNASIUM.

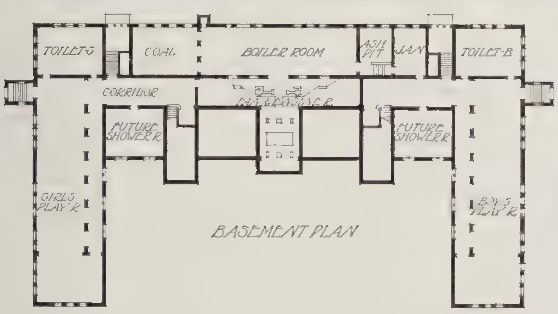
THE FIELD HOUSE AND GYMNASIUM BUILDING,
AT
HANNIBAL HAMLIN PARK, CHICAGO.

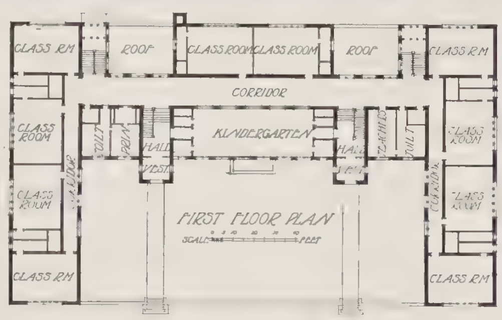
PERKINS & HAMILTON, ARCHITECTS.

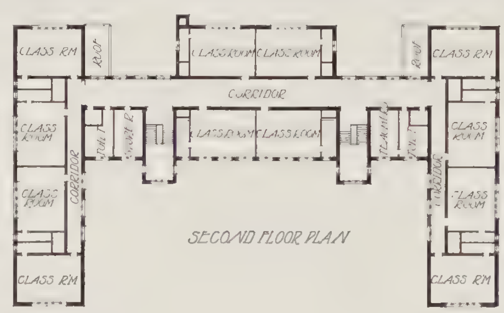


GENERAL GROUND PLAN.

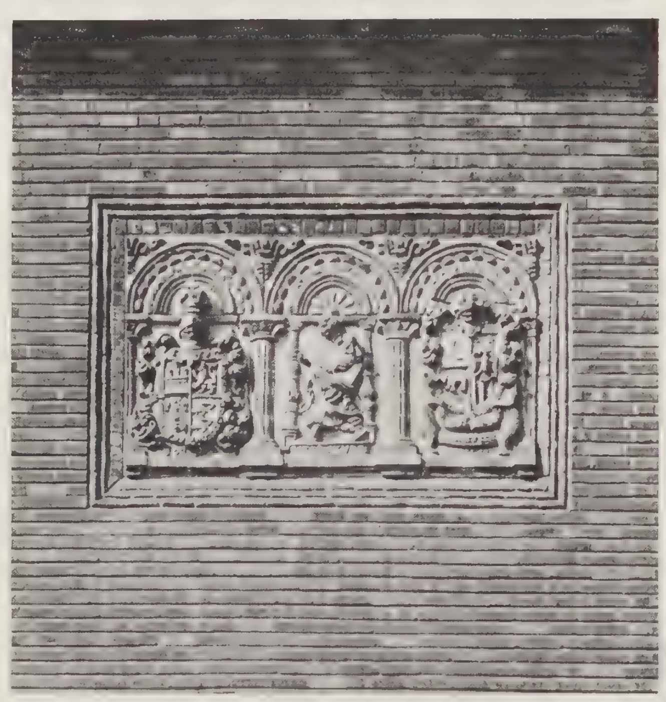
THE FIELD HOUSE AND GYMNASIUM BUILDING AT HANNIBAL HAMLIN PARK, CHICAGO.
PERKINS & HAMILTON, ARCHITECTS.

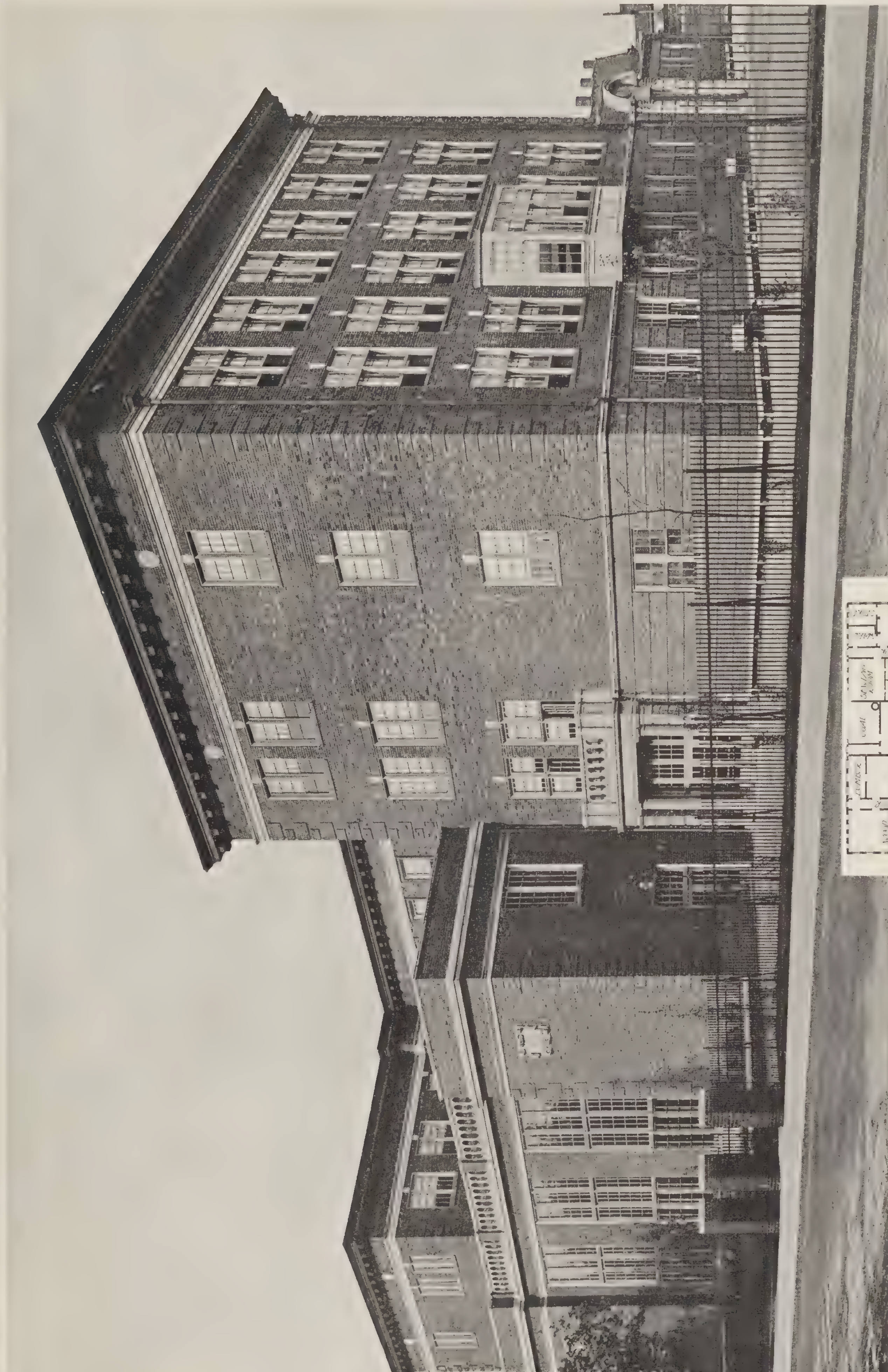


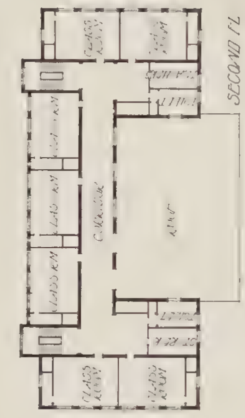




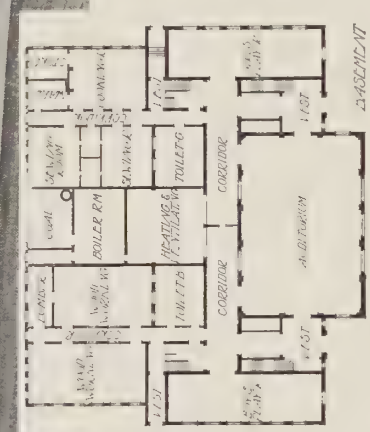
THE NEW ASHLAND SCHOOL
ST. LOUIS, MO.
WILLIAM B. ITTNER, ARCHITECT.



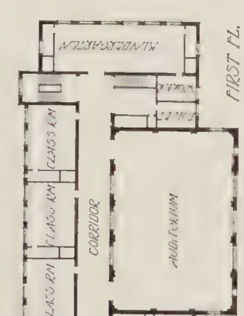




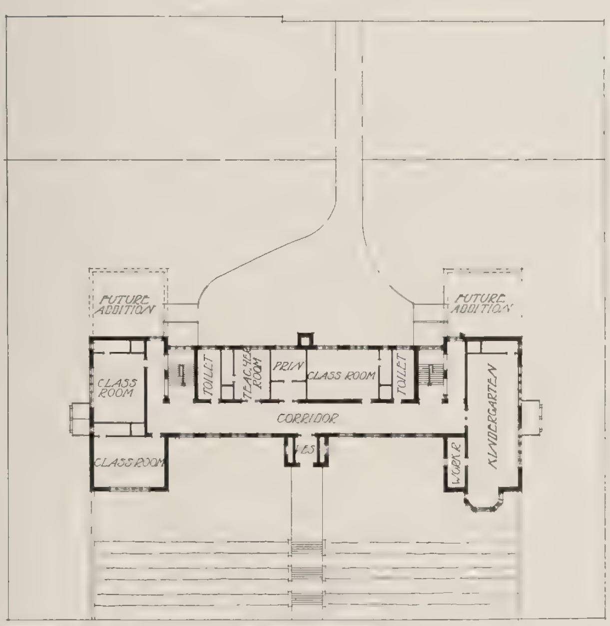
William B. Ittner
Architect.



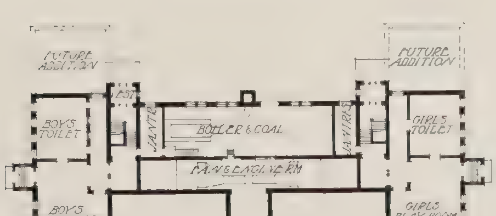
THE NEW
FRANKLIN SCHOOL
ST. LOUIS, MO.



SECOND FLOOR PLAN



FIRST FLOOR PLAN

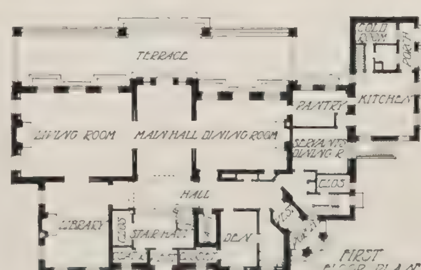


BASEMENT PLAN

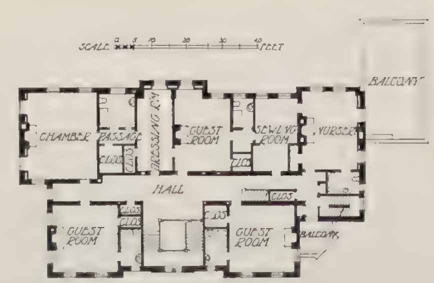
THE NEW MERAMEC SCHOOL, ST. LOUIS, MO.
WILLIAM B. ITTNER, ARCHITECT.

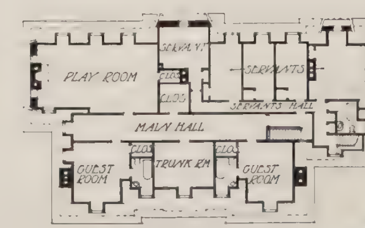
GARAGE AT CLEVELAND, OHIO.
FRANK B. MEADE, ARCHITECT.

HOUSE AT ST. LOUIS, MO.
COPE & STEWARDSON, ARCHITECTS.

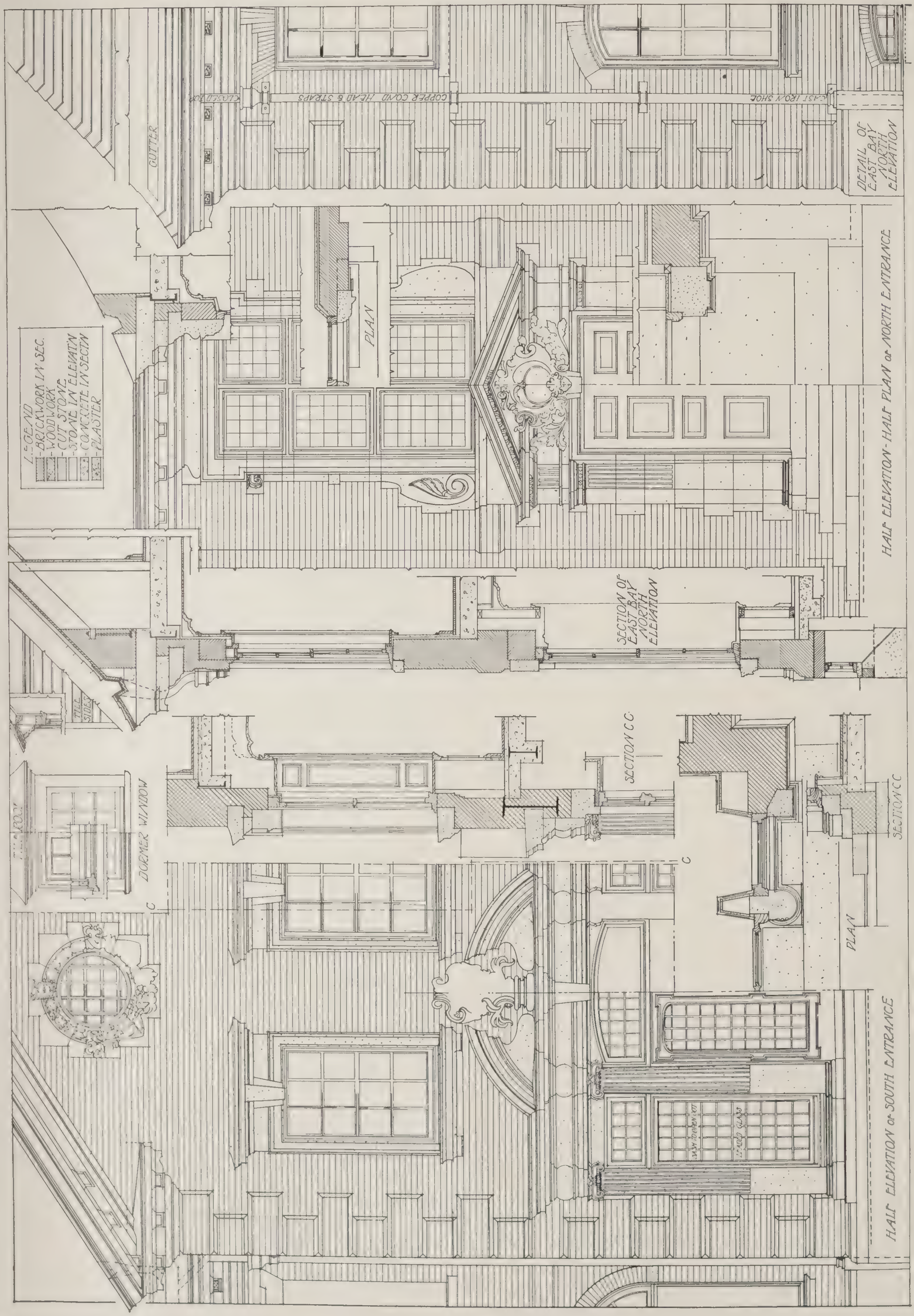


HOUSE AT
ST. LOUIS, MO.
COPE & STEWARDSON,
ARCHITECTS.



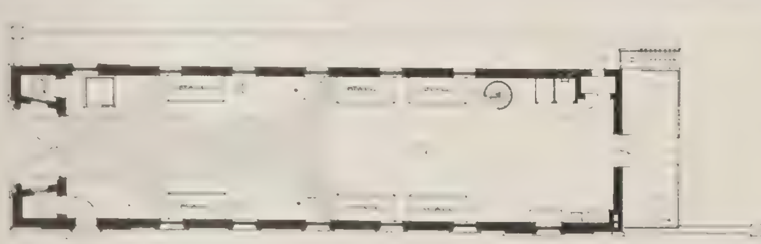


TWO ENTRANCES, HOUSE AT ST. LOUIS, MO.
COPE & STEWARDSON, ARCHITECTS.



EXTERIOR DETAILS, HOUSE AT ST. LOUIS, MO.

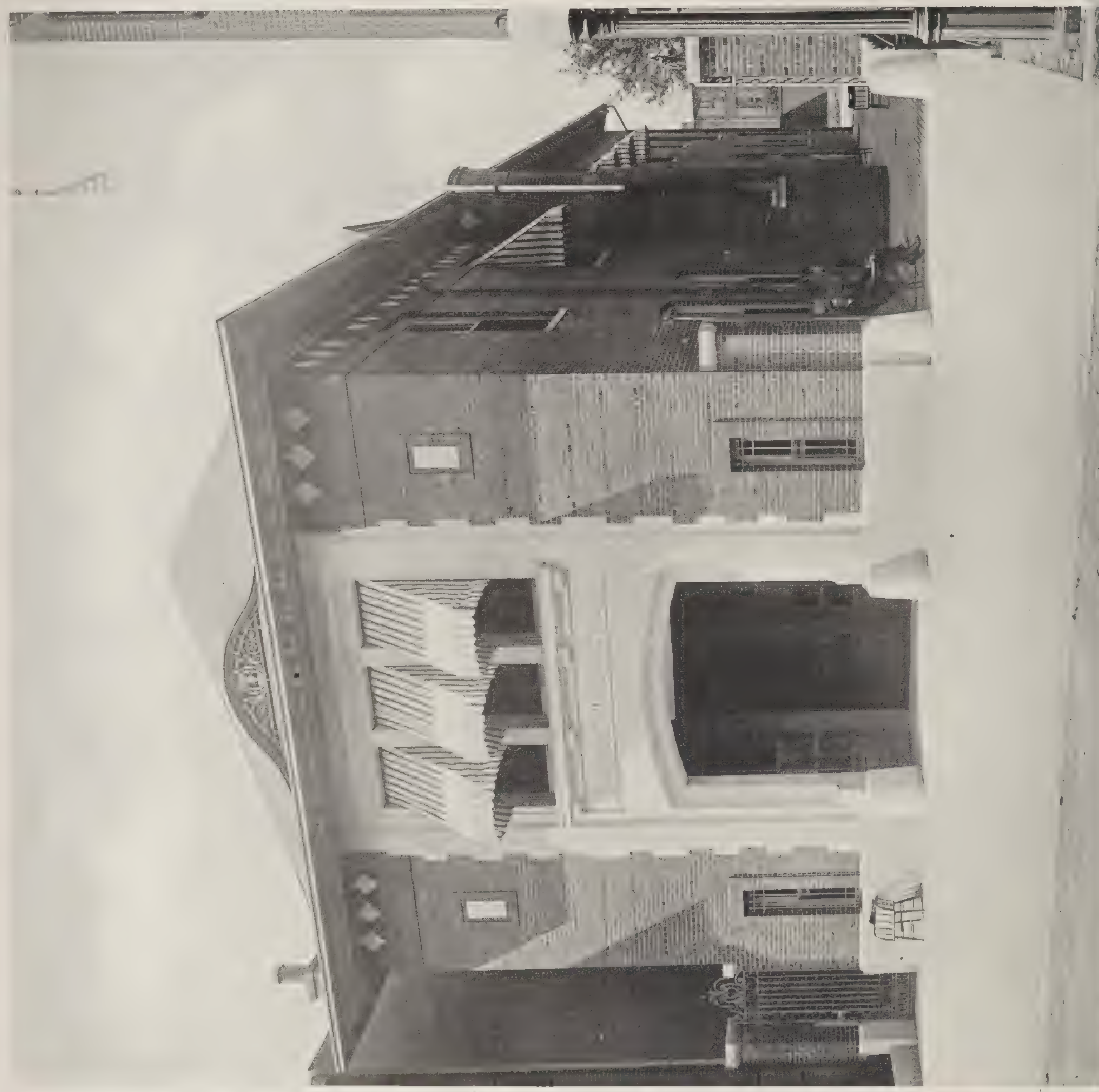
COPE & STEWARDSON, ARCHITECTS.



FIRST FLOOR PLAN.

SECOND FLOOR PLAN.

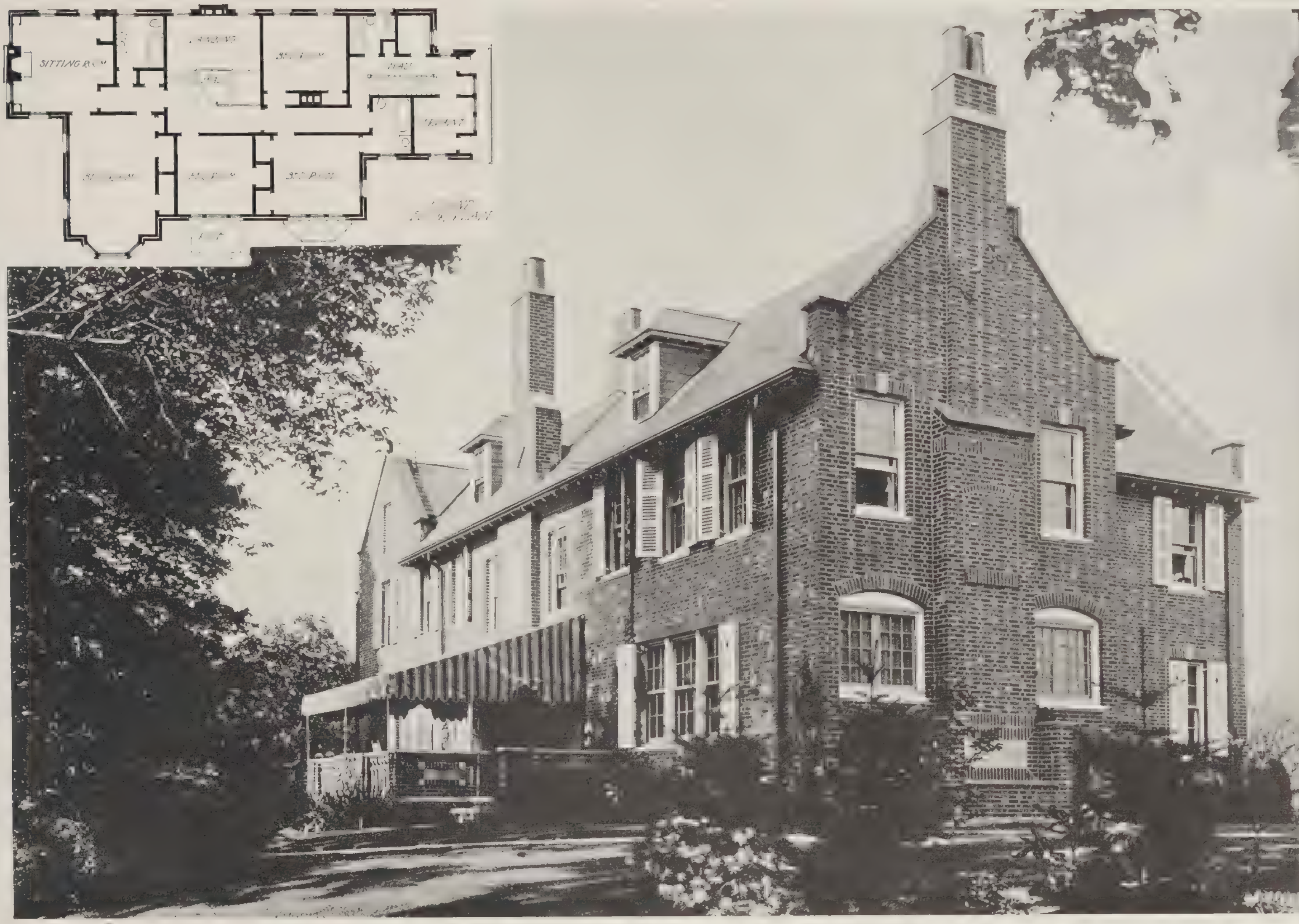
ENGINE HOUSE, BALTIMORE, MD.
ELLICOTT & EMMART, ARCHITECTS.



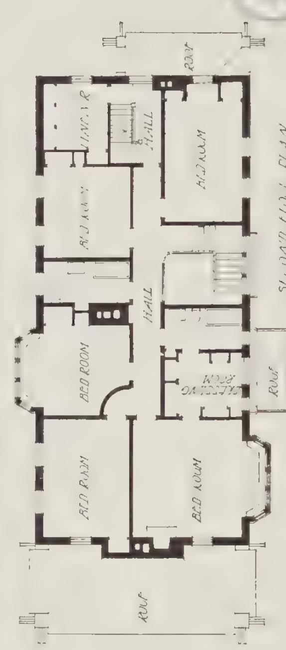
HORNBLOWER & MARSHALL, ARCHITECTS

ENGINE HOUSE NO. 23, WASHINGTON, D. C.

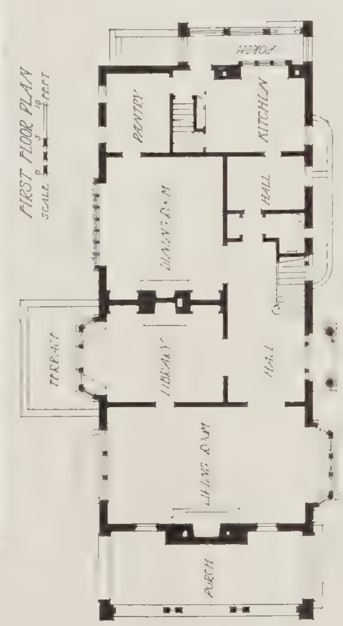
HOUSE AT WEST NEWTON, MASS.
FRANK CHOUTEAU BROWN, ARCHITECT.

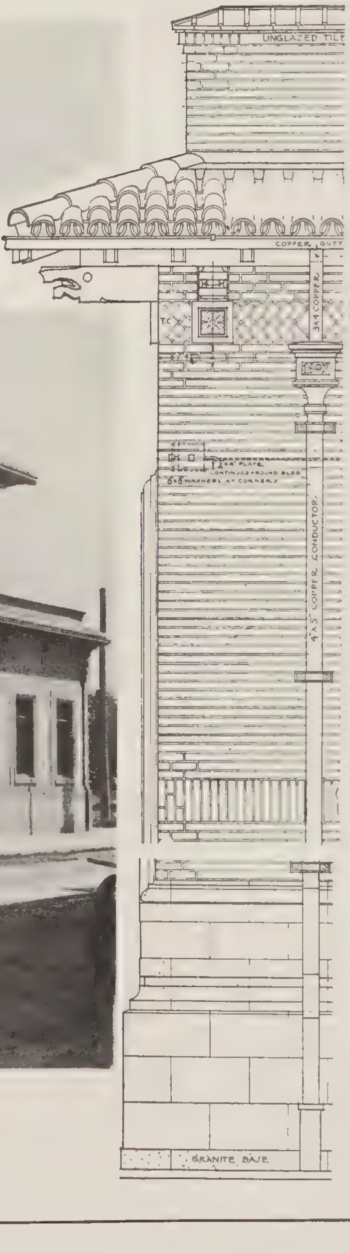


HOUSE AT WEST NEWTON, MASS.
FRANK CHOUTEAU BROWN, ARCHITECT.

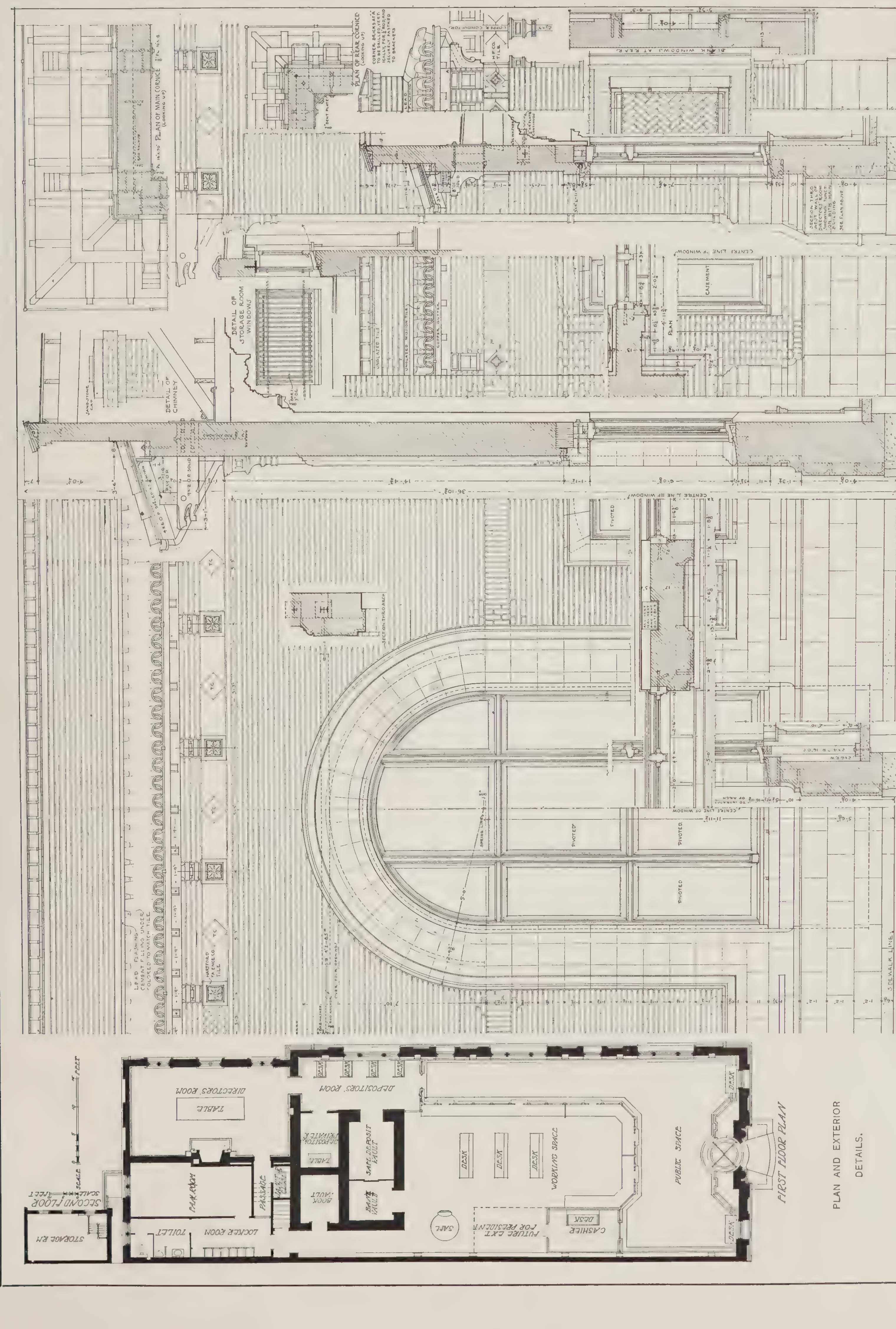


HOUSE AT CLEVELAND, OHIO.
BUILT OF HOLLOW TILE TERRA COTTA BLOCKS WITH STUCCO FINISH.
FRANK B. MEADE, ARCHITECT.





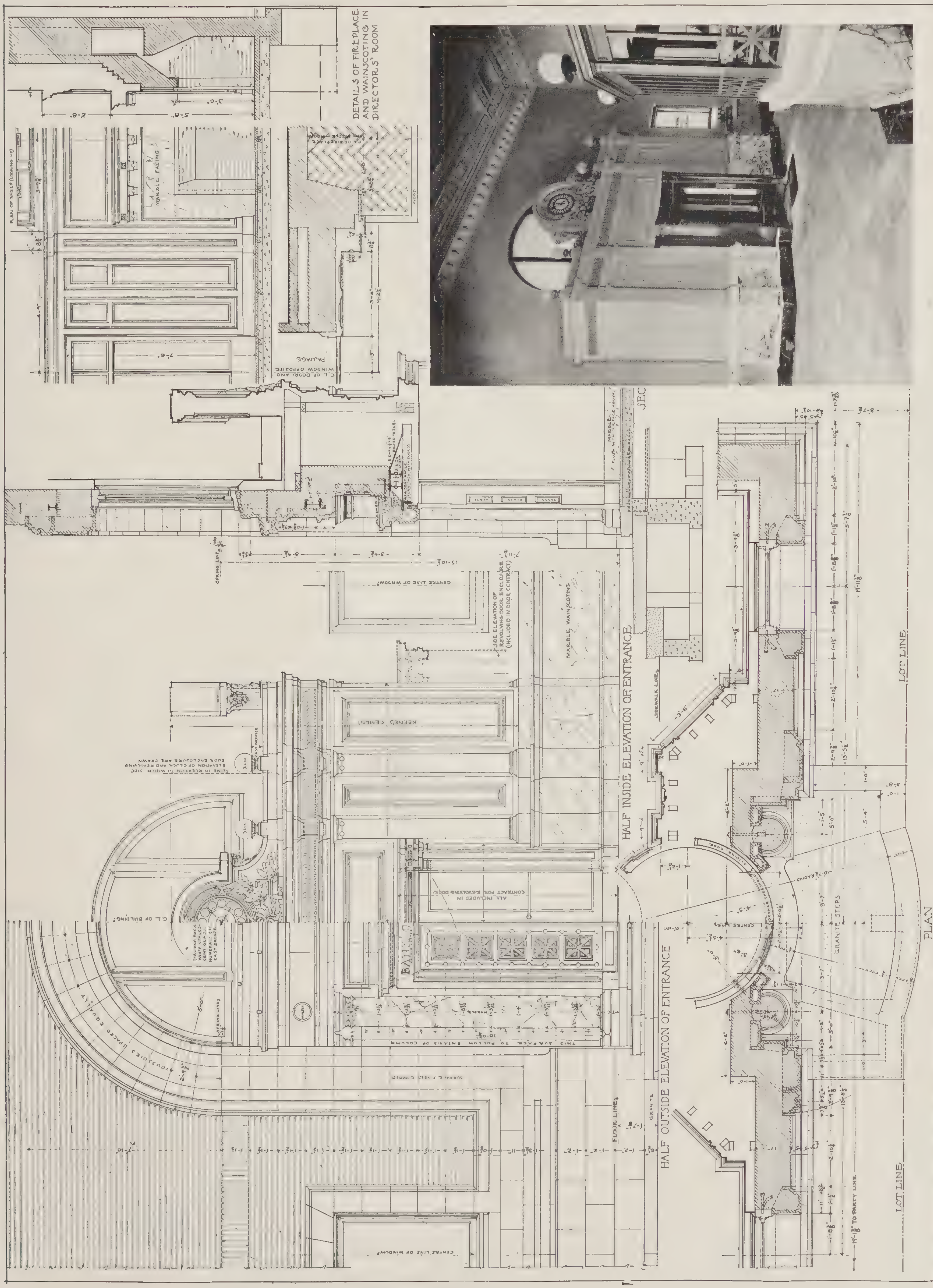
BANK OF YOLO, WOODLAND, CALIFORNIA.
IRA W. HOOVER, ARCHITECT.



BANK OF YOLO, WOODLAND, CALIFORNIA.

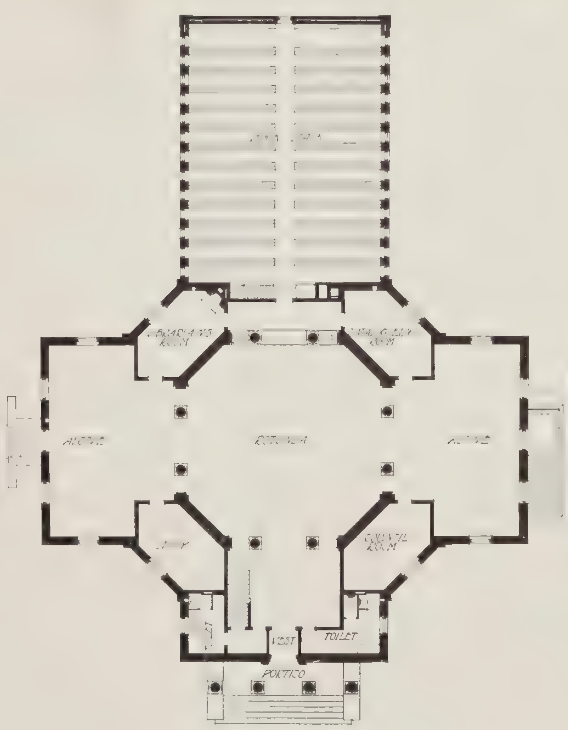
IRA W. HOOVER, ARCHITECT.

PLAN AND EXTERIOR DETAILS.

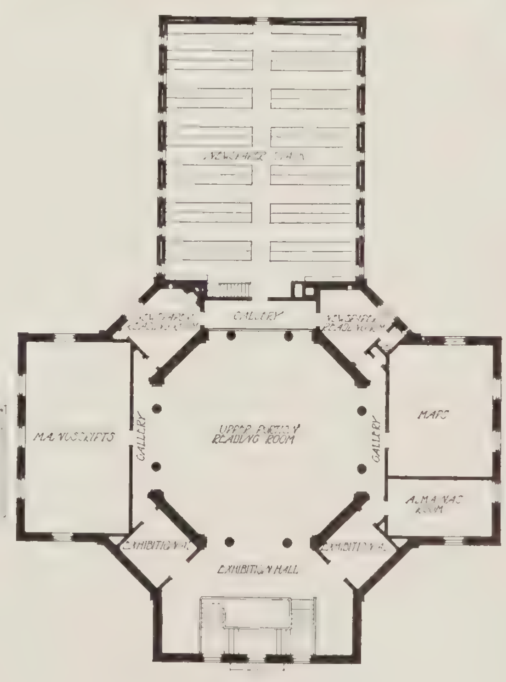


ENTRANCE DETAILS, BANK OF YOLO, WOODLAND, CALIFORNIA.
IRA W. HOOVER, ARCHITECT.

BASEMENT PLAN



FIRST FLOOR PLAN



SECOND FLOOR PLAN

SCALE FEET

AMERICAN ANTIQUARIAN SOCIETY BUILDING, WORCESTER, MASS.

BIGELOW & WADSWORTH AND R. CLIPSTON STURGIS, ASSOCIATED ARCHITECTS.

INTERIOR AND EXTERIOR VIEWS.

AMERICAN ANTIQUARIAN SOCIETY BUILDING, WORCESTER, MASS.

BIGELOW & WADSWORTH AND R. CLIPSTON STURGIS, ASSOCIATED ARCHITECTS.

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